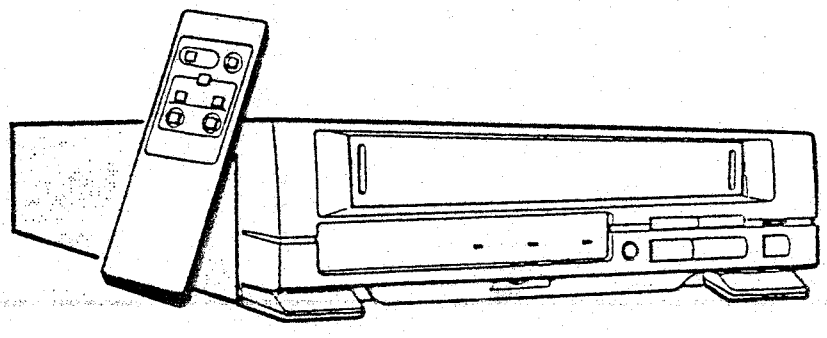
# Service Manual

# ORION VHS PAL
# VIDEO CASSETTE PLAYER

## VP - 290 RC
## MTC - 300



Bestell-Nr.:

**2301**

*Bei technischen Änderungen können Ergänzungsblätter angefordert werden.*

*Specifications are subject to change without notice.*

CHASSIS CORD A

# SPECIFICATONS

| | |
|---|---|
| **Power Source :** | AC220V 50Hz |
| **Power Consumption :** | Approx. 16W |
| **Temperature :** | 5°C - 40°C |
| **Television System :** | CCIR : 625 lines, 50 fields<br>PAL color signal<br>(Including OST color signal) |
| **Video Playback System :** | 2 rotary heads, helical scanning system<br>Luminance : FM azimuth recording<br>Color signal : converted subcarrier phase shift recording |
| **Audio Track :** | 1 track |
| **FF/REW Winding Time :** | 5 Minutes(Max.)(E-180) |
| **Tape Width :** | 12.65 mm(1/2 inch) |
| **Tape Speed :** | 23.39 mm/s |
| **RF Converter :** | UHF channel 36( ±4)<br>PAL color signal<br>Test signal generator |
| **Heads :** | Video : 2 rotary heads<br>Audio/Control : 1 stationary head |
| **Output Level :** | Video : VIDEO OUT jack(RCA) 1.0Vp-p, 75 ohm unbalanced<br>Audio : AUDIO OUT jack(RCA) - 8 dB, 1K ohm unbalanced |
| **Weight :** | 4.3kg |
| **Dimensions :** | 260(W)x86.5(H)x334(D)mm |

# CONTENTS


PAGE

SPECIFICATIONS ..... 1
SERVICING FIXTURES & TOOLS ..... 2
PREVENTIVE CHECKS AND SERVICE INTERVALS ..... 2
DECK PARTS LOCATION ..... 3
MECHANICAL ADJUSTMENTS
1. BEFORE MECHANICAL ADJUSTMENT
1-1: HOW TO REMOVE AND INSTALL STAGE ..... 4
2. REPLACEMENT OF MAIN PARTS
2-1: REEL DISK ..... 4
2-2: A/C HEAD ..... 5
2-3: UPPER DRUM ..... 5
2-4: CYLINDER UNIT ..... 6
2-5: TENSION BAND ..... 6
2-6: LOADING MOTOR/LOADING MOTOR BELT ..... 6
2-7: PINCH ROLLER ..... 6
2-8: CAPSTAN DD UNIT ..... 7
2-9: TRANSISTOR PCB ..... 8
3. CONFIRMATION AND ADJUSTMENT
3-1: CONFIRMATION OF FAST FORWARD TORQUE ..... 8
3-2: CONFIRMATION OF REWIND TORQUE ..... 8
3-3: CONFIRMATION OF PLAYBACK TAKE-UP TORQUE ..... 9
3-4: CONFIRMATION OF REEL BRAKE TORQUE ..... 9
3-5: CONFIRMATION AND ADJUSTMENT OF REEL DISK HEIGHT ..... 9
3-6: CONFIRMATION AND ADJUSTMENT OF TENSION POST POSITION ..... 10
3-7: CONFIRMATION AND ADJUSTMENT OF BACK TENSION ON PLAYBACK ..... 10
4. TAPE RUNNING CONFIRMATION AND ADJUSTMENT
4-1: P1 POST ..... 10
4-2: P4 POST ..... 10
4-3: GUIDE ROLLER ..... 11
4-4: CONFIRMATION AND ADJUSTMENT OF A/C HEAD TILT ..... 11
4-5: ADJUSTMENT OF A/C HEAD HEIGHT AND AZIMUTH ..... 11

PAGE

4-6: TAPE RUNNING ADJUSTMENT ..... 11
ELECTRICAL ADJUSTMENTS
1. BEFORE ELECTRICAL ADJUSTMENT ..... 12
2. ADJUSTMENT PROCEDURE
2-1: PB.SWITCHING POSITION ..... 12
2-2: PLAYBACK LUMINANCE LEVEL ..... 12
2-3: NOISE CANCEL ..... 12
2-4: PLAYBACK AUDIO LEVEL ..... 12
2-5-A: SECAM IDENTIFICATION(1) ..... 13
2-5-B: SECAM IDENTIFICATION(2) ..... 13
MAJOR COMPONENTS LOCATION GUIDE ..... 13
BLOCK DIAGRAMS
TIMING CHART ..... 14
CONTROL/SYSTEM CONTROL ..... 15
SERVO ..... 16
Y.C. ..... 17
Y.C./HEAD AMP/AUDIO / POWER SUPPLY ..... 18
P.C.BOARDS
MAIN ..... 19
DECK / POWER SUPPLY/TRANSISTOR / CONTROL / HEAD AMP. . 20
SCHEMATIC DIAGRAMS
CONTROL/SYSTEM CONTROL ..... 21
SERVO ..... 22
Y.C. ..... 23
Y.C./HEAD AMP/AUDIO ..... 24
POWER SUPPLY ..... 25
INTERCONNECTION DIAGRAM ..... 26
MECHANICAL EXPLODED VIEW ..... 27
DECK EXPLODED VIEWS ..... 28, 29
MECHANICAL REPLACEMENT PARTS LIST ..... 30
DECK REPLACEMENT PARTS LIST ..... 31
ELECTRICAL REPLACEMENT PARTS LIST ..... 32, 33
INTERCHANGEABLE PARTS LIST ..... 33

# PREVENTIVE CHECKS AND SERVICE INTERVALS

The following standard table depends on environmental conditions and usage. Unless maintenance is properly carried out, the following service intervals may be quite shortened as harmful effects may be had on other parts. Also, long term storage or disuse may cause transformation and aging of rubber parts.

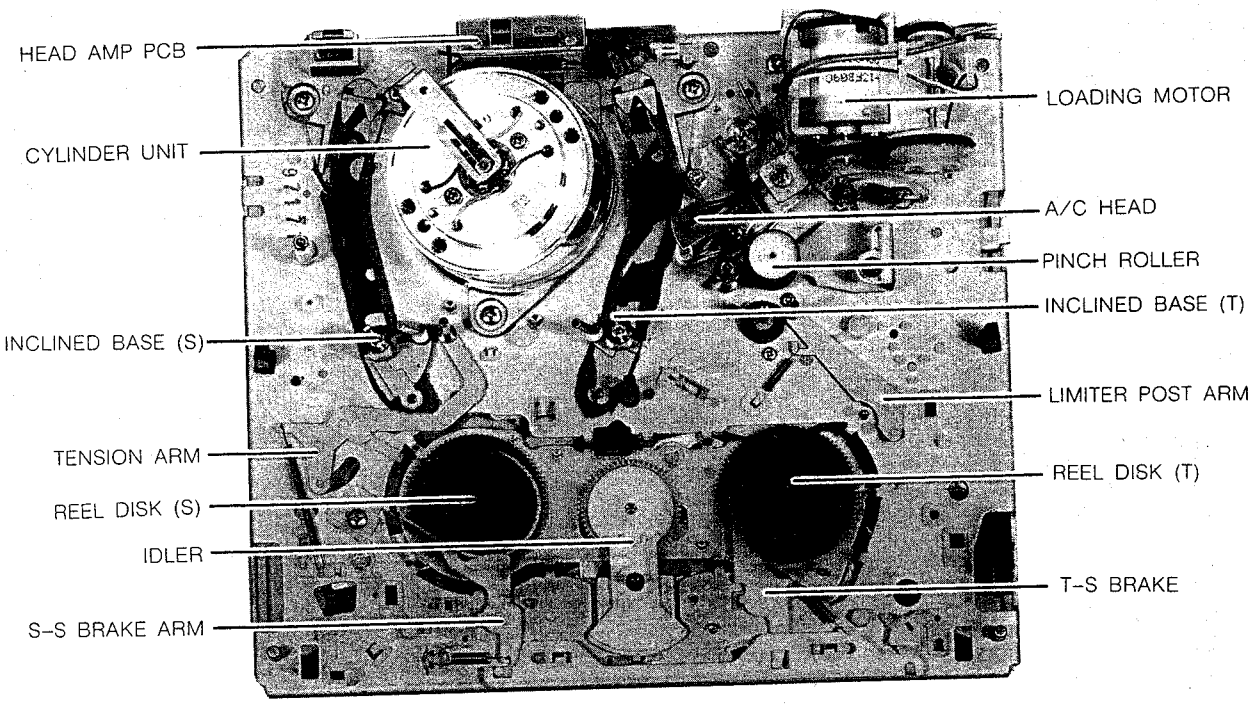
| Parts Name \ Time | 500 hours | 1,000 hours | 1,500 hours | 2,000 hours | 3,000 hours | Notes |
|---|---|---|---|---|---|---|
| Audio Control Head | □ | □ | □ | □ | □ | Clean those parts in contact with the tape. |
| Reel Belt | | □ | | ○ | | Clean the rubber, and parts which the rubber touches. |
| Front Loading Belt | | □ | | ○ | | |
| Pinch Roller | □ | □ | □ | □ | □○ | |
| Capstan DD Unit | | | | | ○ | |
| Loading Motor | | | | | ○ | |
| Tension Band | | | | | ○ | |
| Capstan Shaft | □ | □ | □ | □ | □ | |
| Impedance Roller | □ | □ | □ | □ | □ | Replace when rolling becomes abnormal. |
| Tape Running Guide Post | □ | □ | □ | □ | □ | |
| Cylinder Unit | □ | □○ | □ | □○ | □○ | ※ |

○ : Replace
□ : Clean

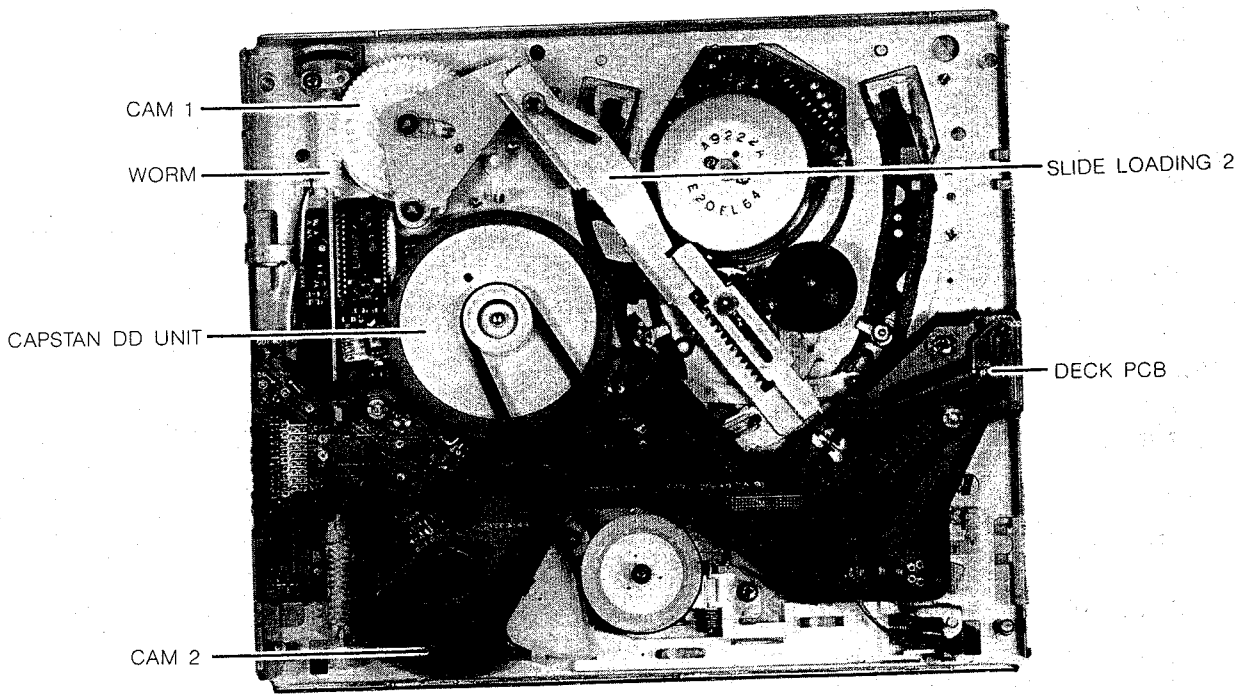
※ Clean the upper drum (especially the video heads) in the direction or drum rotation using a thick, textured cloth with a high quality methyl alcohol. Avoid wiping vertically as this may cause damage to the video heads.

# DECK PARTS LOCATION

(TOP VIEW)




(BOTTOM VIEW)



# MECHANICAL ADJUSTMENTS

## 1. BEFORE MECHANICAL ADJUSTMENT

**CAUTION**

Inferior silicon grease can damage IC's and transistors.
When replacing an IC or transistor, use only specified silicon grease (YG6260).
Remove all the old silicon before applying new silicon.

PRECAUTION

Remove the following items before adjusting.

1. Remove 4 screws and remove the TOP CABINET.
2. Remove 1 screw and remove the BOTTOM CABINET.
3. Remove the FRONT CABINET.
4. Remove the STAGE. **(Refer to Item 1-1)**

Read the following NOTE items before starting work.

* Remove the stage when replacing the deck parts.
* Place an object which weighs between 350g and 500g on the Cassette Tape to keep it steady when you want to make the tape run without the stage. (Do not place an object which weighs over 500g.)
* When you activate the deck without the stage, short Q1101(BOT SENSOR). EOT/BOT sensor will not function in this condition. Be sure to return the deck to it's original condition after repairs are completed.

### 1-1: HOW TO REMOVE AND INSTALL STAGE

REMOVAL **(Refer to Fig. 1)**

1. Remove 2 screws ① from the main PCB.
2. Remove the screw located inside the unit on the top of the JACK PLATE. Disconnect the main PCB by releasing the 2 hooks (1 on each side of the unit).
3. Remove the pulley of loading motor box and the loading motor belt hooked on the stage worm.
4. Remove the screws ② and ③ in the EJECT mode.
5. Push the stage toward arrow mark, and lift up to remove the stage.

NOTE

When you remove and install the stage, be careful not to touch the guide pin or cylinder head.

INSTALLATION

Install new stage in the reverse steps of REMOVAL.

NOTE

When you re-install the stage, it should be in the EJECT mode.

CONFIRMATION

1. The front loading operation works well when turning on the power and when inserting a cassette tape into the stage.
2. Each function works well when pressing the PLAY and EJECT buttons.

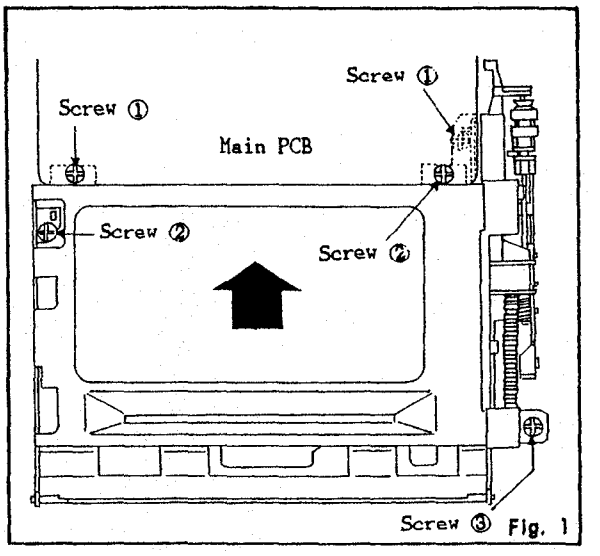


Fig. 1

## 2. REPLACEMENT OF MAIN PARTS

### 2-1: REEL DISK

REMOVAL **(Refer to Fig. 2-1)**

(Supply Reel Disk)

1. Remove the actuator sub brake.
2. Remove the SS brake spring, then remove the SS brake arm.
3. Remove the tension band from the main chassis.
4. Remove the polyslider washer ①.
5. Pull the supply reel disk ③ upward and replace it.

(Take-Up Reel Disk)

1. Remove the actuator sub brake.
2. Remove the TS brake spring, then remove the TS brake.
3. Remove the polyslider washer ④.
4. Pull the take-up reel disk ⑤ upward and replace it.

NOTE

The height adjustment washers ② and ⑥ are sometimes attached to the back of the reel disk.

INSTALLATION

(Supply/Take-Up Reel Disk)

1. Clean the reel disk shaft and put in height adjusting washers ② and ⑥.
2. Install new reel disk.
3. Adjust the height of the reel disk. **(Refer to Item 3-5)**
4. Pull out the new supply/take-up reel disk. After oiling (Cosmo Oil Hydro HV100) the reel disk shaft, install the new supply/take-up reel disk again.
5. Install the supply/take-up reel disk in the reverse steps of REMOVAL.

# MECHANICAL ADJUSTMENTS

NOTE

1. Be careful not to deform the tension band at the time of removal and installation.
2. Be careful not to scratch the reel disk shaft with the polyslider washer or tool at the time of removal and installation.
3. After installation, adjust and confirm the tension post position. **(Refer to Item 3-6)**

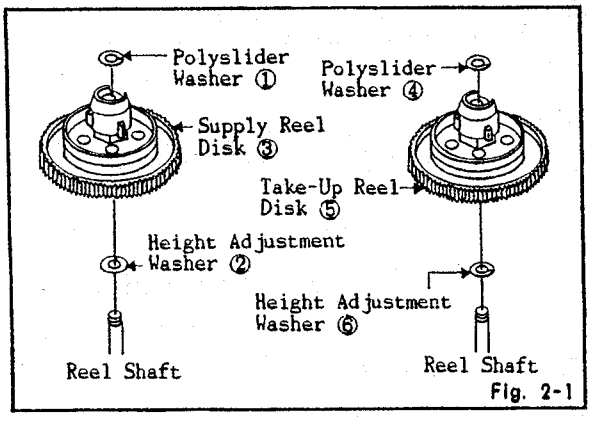


Fig. 2-1

## 2-2: A/C HEAD

REMOVAL **(Refer to Fig. 2-2)**

Remove the screws ①, ② and ③.

INSTALLATION

Install new A/C head in reverse steps of REMOVAL.

NOTE

Do not touch the heads by any means when replacing the A/C head.

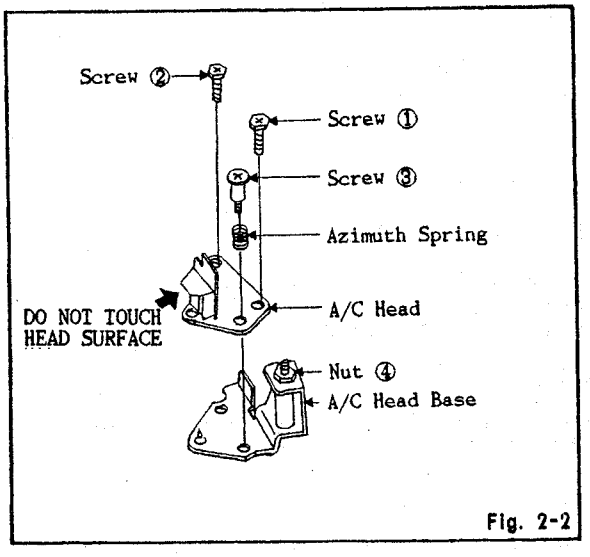


Fig. 2-2

## 2-3: UPPER DRUM

REMOVAL **(Refer to Fig. 2-3)**

1. Remove the screw ② which holds the earth brush .
2. Desolder the lead wires ① from the upper drum assembly.
3. Be sure to use gloves, avoid the surface of cylinder unit. Press the upper drum and hold down the upper drum preventing it from turning, then remove the screws ④, and remove the upper drum with the upper drum fixing jig **(JG031)**.

INSTALLATION

Install new upper drum in the reverse steps of REMOVAL.

NOTE

1. Do not apply excessive pressure to screwdriver.
2. Before installing, confirm that there are no scratches or dust on the disk, upper drum surface and drum head surface.
3. When setting, take care not to let any dust or dirt go into the clearance between disk and upper drum.
4. Do not touch the surface of the cylinder head.
5. Check the adjustment of tape running. **(Refer to Item 4-6)**
6. After replacement confirm the following adjustments.

   a. ELECTRICAL ADJUSTMENTS : ITEM 2-1
   b. ELECTRICAL ADJUSTMENTS : ITEM 2-2
   c. MECHANICAL ADJUSTMENTS : ITEM 4-3

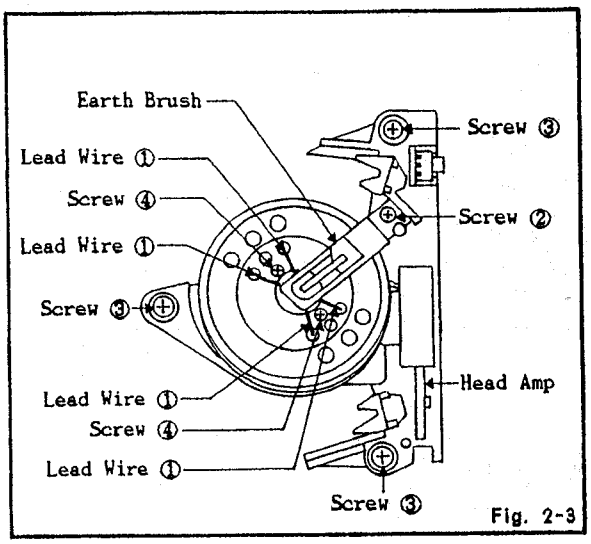


Fig. 2-3

# MECHANICAL ADJUSTMENTS

## 2-4: CYLINDER UNIT

REMOVAL **(Refer to Fig. 2-3)**

1. Remove the transistor PCB. **(Refer to Item 2-9)**
2. Disconnect the connector (CP4102, 4 pin) from the head amp PCB.
3. Remove the screws ③, then remove the cylinder unit from the main chassis.
4. Disconnect the connector of the cylinder motor.

INSTALLATION

Install new cylinder unit in reverse steps of REMOVAL.

NOTE

1. Do not touch the surface of the cylinder head.
2. After replacement confirm the following adjustments.

   a. ELECTRICAL ADJUSTMENTS : ITEM 2-1
   b. ELECTRICAL ADJUSTMENTS : ITEM 2-2
   c. MECHANICAL ADJUSTMENTS : ITEM 4-3

## 2-5: TENSION BAND

REMOVAL **(Refer to Fig. 2-4)**

1. Remove the actuator sub brake.
2. Remove the SS brake spring, then remove the SS brake arm.
3. Remove the screw ①.
4. Remove the tension band from the tension arm.

INSTALLATION

Install new tension band in reverse steps of REMOVAL.

NOTE

1. Install the tension band without twisting it.
2. Adjust the placement of the tension post. **(Refer to Item 3-6)**
3. Adjust and confirm the back tension during playback. **(Refer to Item 3-7)**

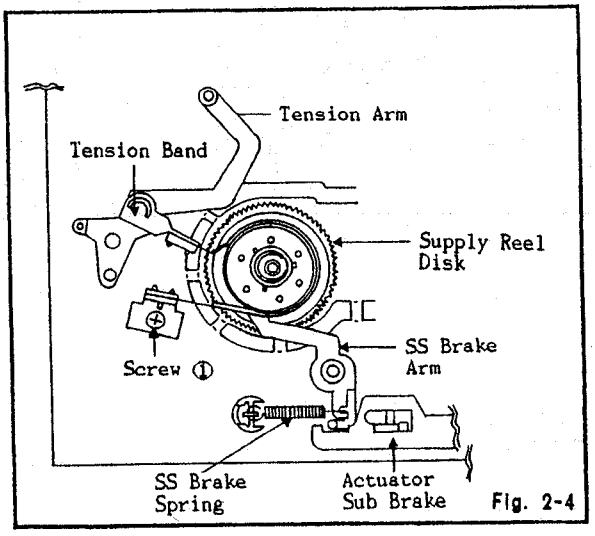


Fig. 2-4

## 2-6: LOADING MOTOR / LOADING MOTOR BELT

REMOVAL **(Refer to Fig. 2-5)**

1. Remove the 2 wires soldered to the loading motor.
2. Remove the lead wire in the hook of the loading motor box.
3. Remove the loading motor belt ②.
4. Remove the screw ①, then remove the loading motor box.
5. Remove the loading motor belt ③.
6. Remove the screw ④, then remove the loading motor upward.

INSTALLATION

Install new loading belt in reverse steps of REMOVAL.

NOTE

1. Clean the pulley when replacing loading belt.
2. Replace it while in the EJECT mode.
3. Avoid getting grease on the loading belt.

CHECK AFTER INSTALLATION

1. Check if strange sound is heard in PLAY mode.
2. Check if P2 post and P3 post are fitted to the post stopper.
3. Check if P2 post and P3 post are completely returned in EJECT mode.

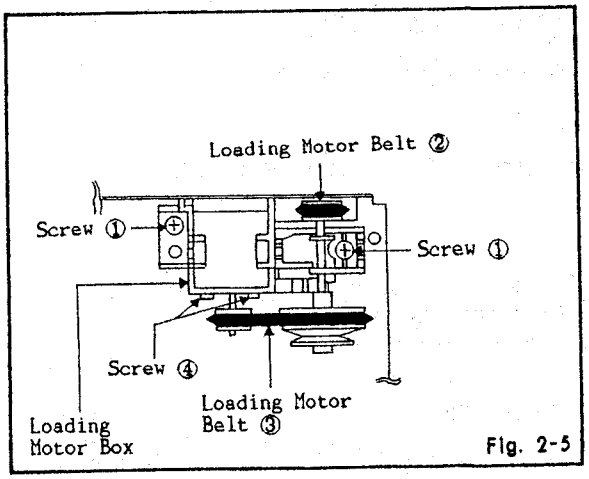


Fig. 2-5

## 2-7: PINCH ROLLER

REMOVAL **(Refer to Fig. 2-6)**

1. Remove the pinch roller arm spring.
2. Remove the polyslider washer ①.
3. Remove the pinch roller.

INSTALLATION

Install new pinch roller in reverse steps of REMOVAL.

NOTE

1. Be careful not to bend the pinch roller arm in removal and installation.
2. Do not touch the pinch roller. (Use gloves.)

CHECK AFTER INSTALLATION

Check if the tape is running normally in PLAY mode.

# MECHANICAL ADJUSTMENTS

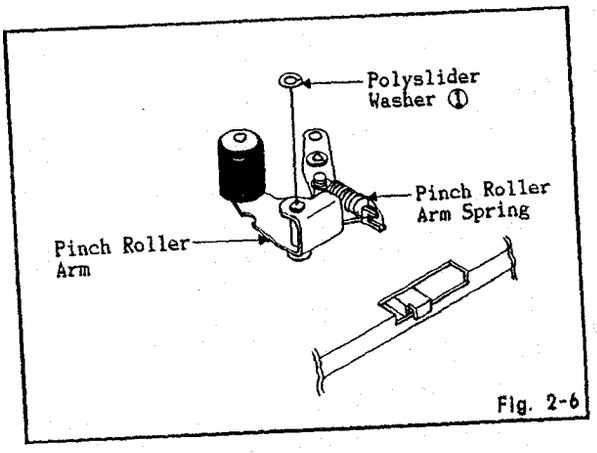


Fig. 2-6

## 2-8: CAPSTAN DD UNIT

REMOVAL

1. Remove the reel belt.
2. Remove the solder "A" positions, remove the screws ① and then remove the deck bottom PCB.
3. Remove the loading motor belt ②.
4. Remove the screw ④, then remove the bracket worm 3.
5. Pull the hook ③ in the direction of arrow, then remove the worm. **(Refer to Fig. 2-7-A)**
6. Remove the screws ①, then remove the capstan DD unit. **(Refer to Fig. 2-7-B)** (Be sure to support with hand under the capstan DD unit.)

INSTALLATION

Install new capstan DD unit in reverse steps of REMOVAL.

NOTE

1. Do not bend the limiter post.
2. Use the specified screw held to the DD unit.
3. Avoid getting grease on the reel belt.
4. Be sure to install in the EJECT position. **(Refer to Fig. 2-7-D, E)**
5. Install in the position where the capstan DD unit PCB gets up to the "B" position. **(Refer to Fig. 2-7-A)**
6. When installing the worm, be sure to unlock the hook ③ in the direction of arrow, and the cam 1 and cam 2 must be meshed smoothly. **(Refer to Fig. 2-7-A)**
7. When installing the deck bottom PCB, be sure to install the rotary switch in the EJECT position. The EJECT position is the point where the "A" tooth is aligned to the "B". **(Refer to Fig. 2-7-C)**

CHECK AFTER INSTALLATION

1. Check if tape running is normal in PLAY mode.
2. Check if FF/REW mode works normally.

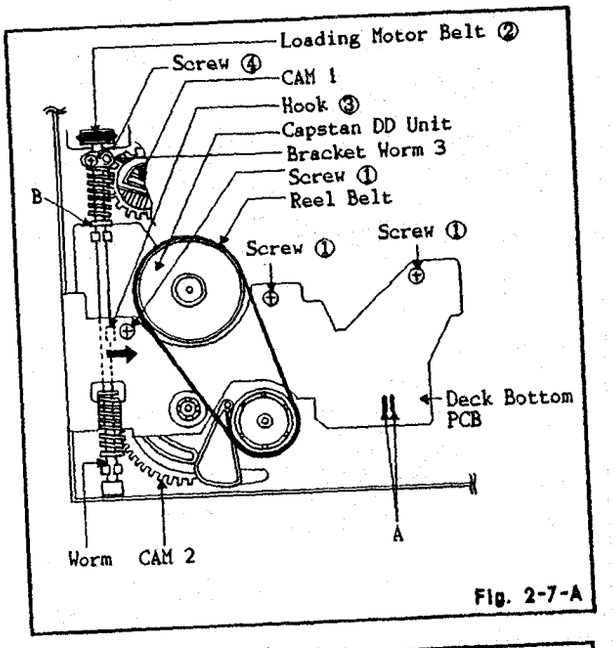


Fig. 2-7-A

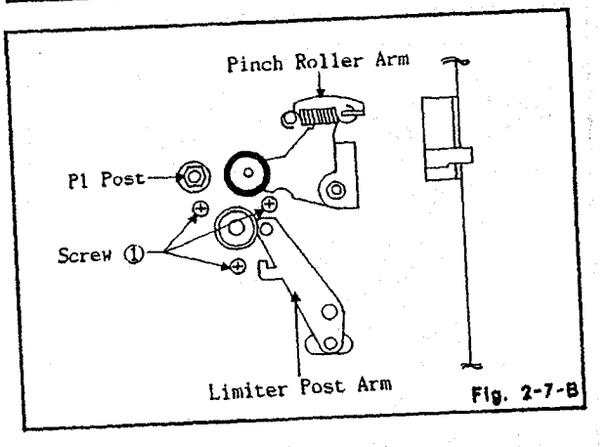


Fig. 2-7-B

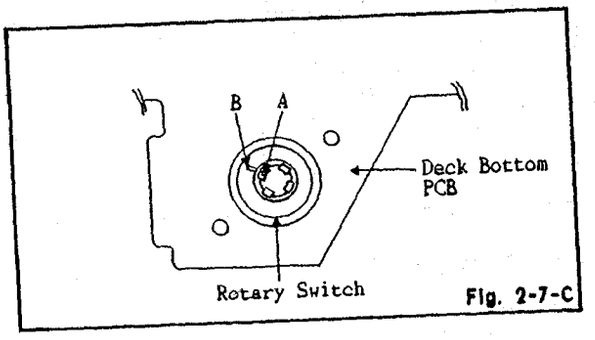


Fig. 2-7-C

# MECHANICAL ADJUSTMENTS

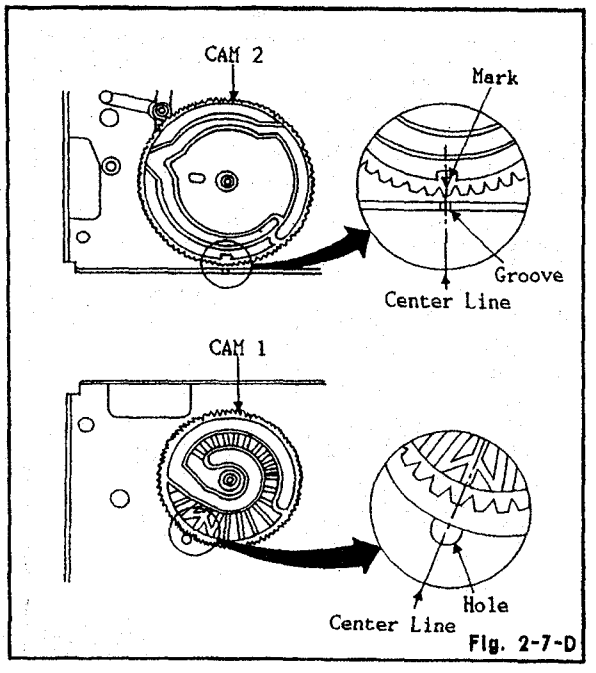


Fig. 2-7-D

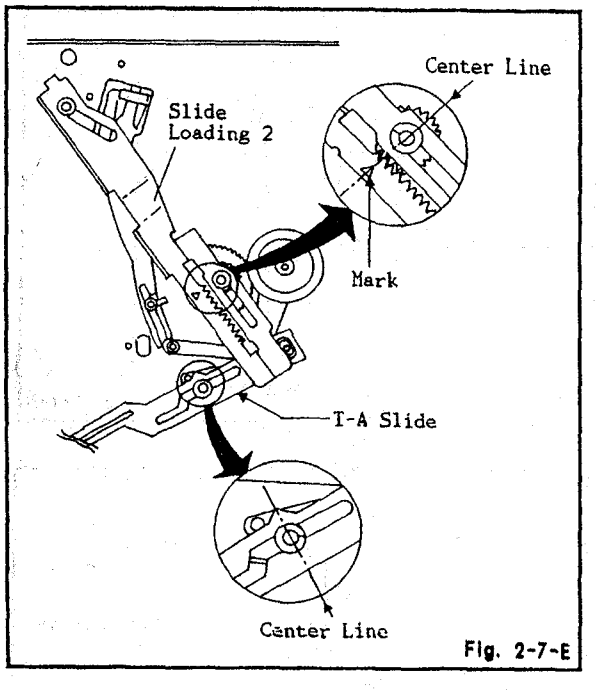


Fig. 2-7-E

### 2-9: TRANSISTOR PCB

REMOVAL

1. Insert a small flat-blade screwdriver into the transistor spring as shown in **Fig. 2-8.**
2. Hold both edges of the transistor PCB ("A" part) with your fingers and pull out the transistor PCB while turning the driver.

INSTALLATION

Install new transistor PCB in reverse steps of REMOVAL.

NOTE

1. The unit should be unplugged from the AC outlet.
2. Do not scratch or mar the cylinder.
3. Be careful not to split the transistor PCB.
4. If the transistor spring is broken when holding or removing the transistor PCB, replace with a new one.

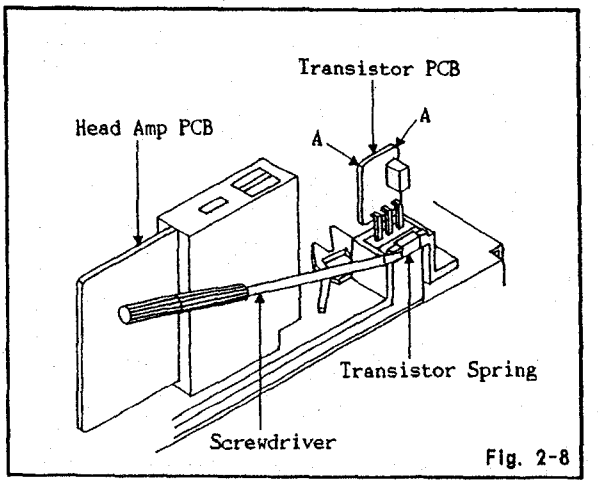


Fig. 2-8

## 3. CONFIRMATION AND ADJUSTMENT

### 3-1: CONFIRMATION OF FAST FORWARD TORQUE

CONFIRMATION

1. Set torque gauge (**JG002G**) on take-up reel disk, and place unit in FAST FORWARD mode. **(Refer to Fig. 3-1)**
2. Confirm that torque is more than 800g/cm.

NOTE

After setting the torque gauge on the reel disk, hold the gauge in place. Push the FAST FORWARD button and the reel disk will begin to turn.

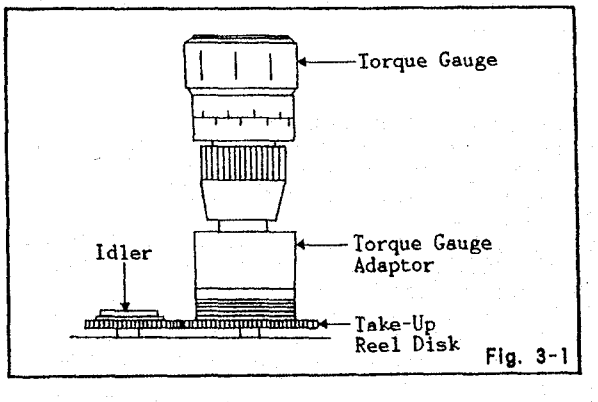


Fig. 3-1

### 3-2: CONFIRMATION OF REWIND TORQUE

CONFIRMATION

1. Operate within 4 or 5 seconds after the reel disk begins to turn.
2. Set torque gauge (**JG002G**) on supply reel Disk, and place the unit in REWIND mode. **(Refer to Fig. 3-2)**
3. Confirm that torque is more than 800g/cm.

NOTE

After setting the torque gauge on the reel disk, hold the gauge in place. Push the FAST FORWARD button and the reel disk will begin to turn.

# MECHANICAL ADJUSTMENTS

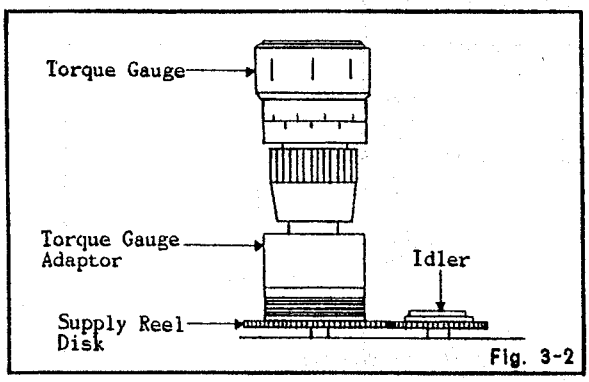


Fig. 3-2

### 3-3: CONFIRMATION OF PLAYBACK TAKE-UP TORQUE

CONFIRMATION

1. Set the torque gauge (**JG002F**) on the rewind reel disk, then check PB mode.
2. Make sure that the torque covers the range, 60~150g/cm.

### 3-4: CONFIRMATION OF REEL BRAKE TORQUE

CONFIRMATION **(Refer to Fig. 3-3-A)**

(Take-Up Reel Brake)

1. Set the STOP mode.
2. Set the torque gauge (**JG002G**) to the take-up reel and turn it counter-clockwise.
3. Confirm that it is more than 200g/cm at that time.

CONFIRMATION **(Refer to Fig. 3-3-B)**

(Supply Reel Brake)

1. Set the STOP mode.
2. Set the torque gauge (**JG002G**) to the supply reel and turn it clockwise.
3. Confirm that it is more than 200g/cm at that time.

NOTE

Separate the idler from the reel and confirm the brake torque.

NOTE

Refer to the table below listed possible causes of troubles when you cannot confirm the requested items.

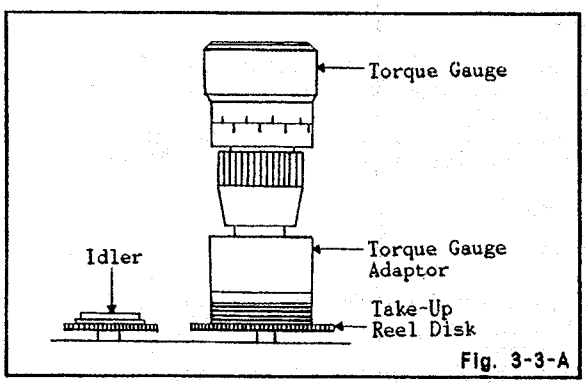


Fig. 3-3-A

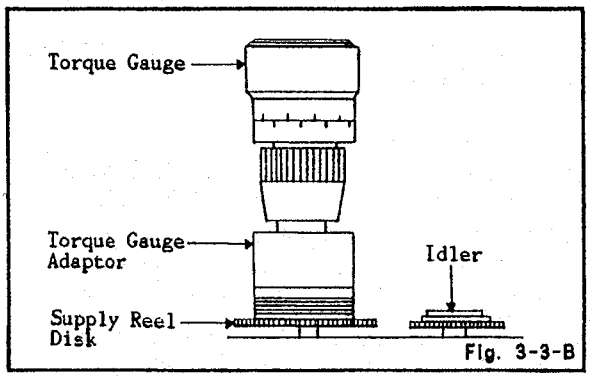


Fig. 3-3-B

NOTE

Refer to the table below listed possible causes of troubles when you cannot confirm the requested items.

| CONFIRMATION ITEM | CHECK POINT (REPLACEMENT) |
|---|---|
| 3-1<br>3-2<br>3-3 | Capstan belt may be stretched. Clutch may be worn out (if so, change reel disk.) Idler ass'y may be worn out. |
| 3-4 | Main brake belt may be worn out. |

### 3-5: CONFIRMATION AND ADJUSTMENT OF REEL DISK HEIGHT

ADJUSTMENT

1. Set the master plane (**JG022**) at mechanism framework, taking care not to scratch the drum, as shown in **Fig. 3-4-A.**
2. Confirm that the reel disk is lower than "A" of the reel disk height adjustment jig, (**JG024**) on the master plane and higher than "B" as shown in **Fig. 3-4-B.**
3. When it does not satisfy above items, adjust to less than 0.1mm~0.5mm with the height adjustment washer.

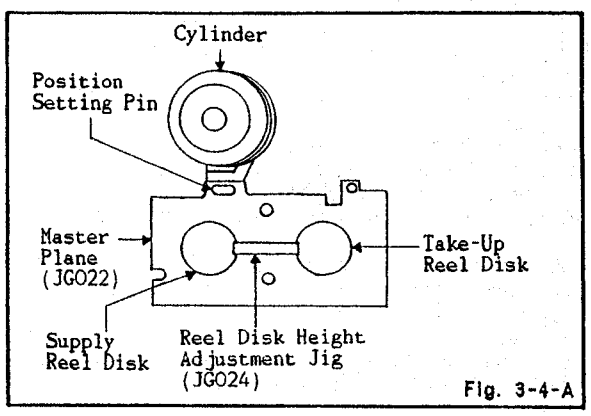


Fig. 3-4-A

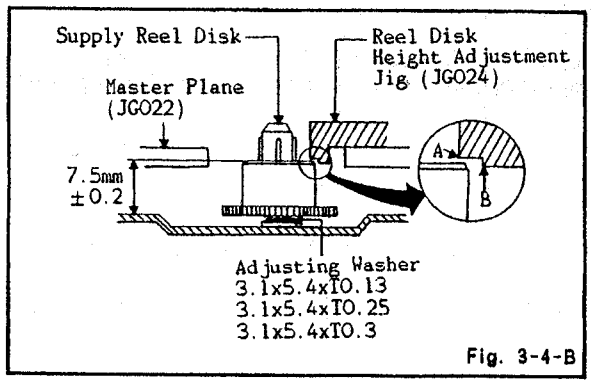


Fig. 3-4-B

# MECHANICAL ADJUSTMENTS

## 3-6: CONFIRMATION AND ADJUSTMENT OF TENSION POST POSITION

CONFIRMATION

1. Turn on the power and set to the PLAY mode by using the tension post adjustment jig (**JG036**).
2. As soon as the guide rollers, L, R begin to draw the tape from the cassette, the tension post shall move to the left, thus loading will start.
3. Move the tension band adjust to the "A" or the "B" direction to set tension post adjusting jig red line to the round of the tension post. **(Refer to Fig. 3-5)**
4. Confirm that the video tape is not curling at the flange of P1 post or is not running on flanges.

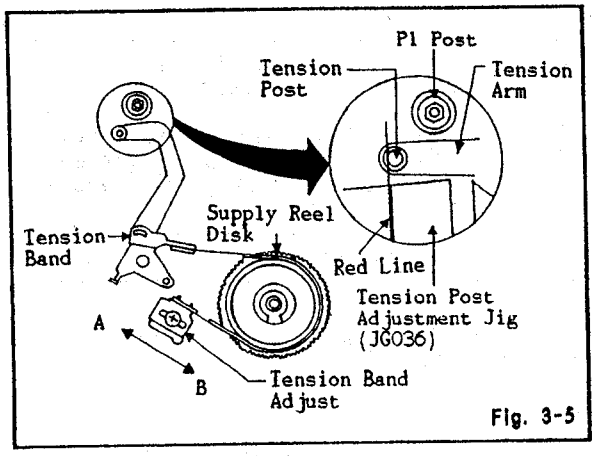


Fig. 3-5

## 3-7: CONFIRMATION AND ADJUSTMENT OF BACK TENSION ON PLAYBACK

CONFIRMATION

1. Load the **E-60** cassette tape recorded in standard speed mode
2. Set the unit in the PLAY mode.
3. Install the tentelometer as shown in **Fig. 3-6.** Confirm the value is within 25~35g/cm at this time.
4. Confirm there video tape is running tight on P1 post.
5. Confirm there is no sag or damage on edges of the tape both in the beginning and ending of the video tape.
6. Adjust when it does not satisfy the above items.
7. Set the tension arm spring to "B" direction when the tentelometer indicates less than 25g/cm. **(Refer to Fig. 3-6)**
   Set the tension arm spring to "A" direction when the tentelometer indicates more than 35g/cm. **(Refer to Fig. 3-6)**

NOTE

The tentelometer should not touch the cylinder or other components in the tape path.

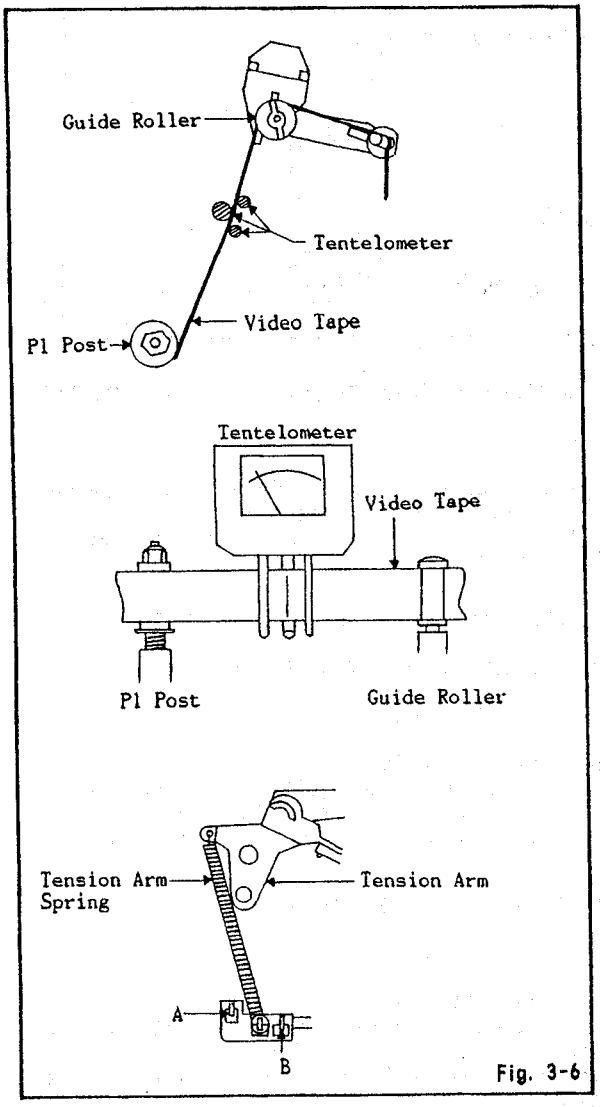


Fig. 3-6

# 4. TAPE RUNNING CONFIRMATION AND ADJUSTMENT

Since tape running is adjusted precisely at factory, it is not necessary to adjust normally. It is necessary to confirm and adjust when the parts of the tape running mechanism are replaced because of long time usage or failure.

## 4-1: P1 POST

ADJUSTMENT

1. Set to the EJECT mode. Install the P1/P4 post height adjustment jig (**JG035**) to the main chassis.
2. Adjust the P1 post with P1/P4 post height adjustment jig "A" part. **(Refer to Fig.4-1)**

## 4-2: P4 POST

ADJUSTMENT

1. Set to the EJECT mode. Install the P1/P4 post height adjustment jig (**JG035**) to the main chassis.
2. Adjust the P4 post with P1/P4 post height adjustment jig "B" part. **(Refer to Fig.4-1)**

# MECHANICAL ADJUSTMENTS

NOTE

1. After Adjustment adjust the guide roller. **(Refer to Item 4-3)** Confirm that there is no crease on the edge of the tape.
2. After adjustment, do not move the nut.
3. After adjustment, fix P4 post with screw lock.
4. After adjustment, adjust the tape running. **(Refer to Item 4-6)**

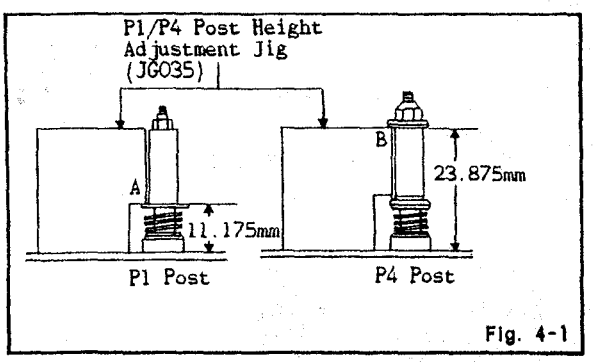


Fig. 4-1

## 4-3: GUIDE ROLLER

ADJUSTMENT

1. Switch on main power and then connect monitor output cord and video input cord to proper positions.
2. Insert the VHS adjustment tape (**JG001**) into the unit.
3. Connect CH-1 and CH-2 of oscilloscope to envelope output and to the test point of switching pulse, respectively.
4. Carry out this adjustment in PLAY mode.
5. Trigger with SW pulse and observe the envelope. **(Refer to Fig. 4-2-A)**
6. Adjust the guide roller height while observing the envelope, and make the envelope flat. Adjust the envelope so that the flatness will not be affected even when the tracking control knob is turned. (Use the adjustment screwdriver **JG005** ).
7. When the tracking control knob is turned (the point that the envelope waveform starts to reduce), adjust the envelope so that its A:B ratio is better than 10:7. **(Refer to Fig. 4-2-B)**
8. Adjust the PB switching position (**ELECTRICAL ADJUSTMENS : ITEM 2-1**) in the PLAY mode.

NOTE

After adjustment, confirm and adjust A/C head tilt. **(Refer to Item 4-4)**

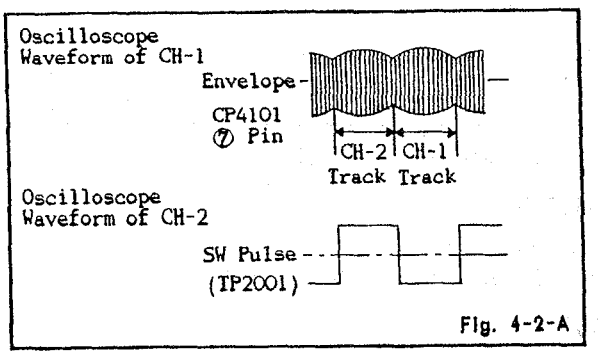


Fig. 4-2-A

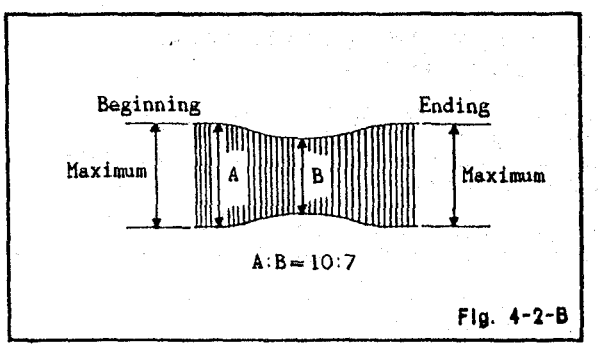


Fig. 4-2-B

## 4-4: CONFIRMATION AND ADJUSTMENT OF A/C HEAD TILT

ADJUSTMENT

When the tape is running abnormally, perform the following adjustments.

1. Check the tape running condition with the unit in the PLAY mode using the **E-60** tape.
2. Confirm that there is no crease on the tape between the guide post and guide roller(R) and the tape is running smoothly. (It is absolutely impossible to get satisfactory sound if the tape is distorted between the A/C head and guide post.)
3. If the tape still does not run smoothly, turn the screw ① and adjust the tilt of the A/C head. Do not move the guide post. **(Refer to Fig. 2-2)**

## 4-5: ADJUSTMENT OF A/C HEAD HEIGHT AND AZIMUTH

ADJUSTMENT

1. Playback a VHS adjustment tape (**JG001**) and observe the waveform at the audio output terminal.
2. Turn the screw ② slowly to change the height of the A/C head. Adjust the height so that the audio output becomes maximum. **(Refer to Fig. 2-2)**
3. Adjust the nut ④. **(Refer to Fig. 2-2)** until the height of the A/C head reaches the position against the tape as shown in **Fig. 4-3.**

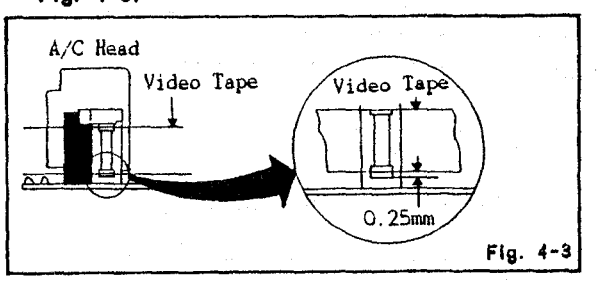


Fig. 4-3

## 4-6: TAPE RUNNING ADJUSTMENT

1. Adjust the height of reel disk. **(Refer to Item 2-1)**
2. Adjust the P1 post, P4 post. **(Refer to Item 4-1, 2)**
3. Confirm and adjust tension post position. **(Refer to Item 3-6)**
4. Adjust the guide roller. **(Refer to Item 4-3)**
5. Adjust the A/C head height and azimuth. **(Refer to Item 4-5)**
6. Adjust the A/C head tilt. **(Refer to Item 4-4)**
7. Set the tracking control to the center position. Turn X-nut adjustment screwdriver (**JG021**) to adjust until the envelope appears maximum.

# ELECTRICAL ADJUSTMENTS

## 1. BEFORE ELECTRICAL ADJUSTMENT

These are adjustments when you replace electric parts or PCB ass'y.
When you repair the electric circuit, please read these adjustments.

1-1: Prepare the following measurement tools for the electrical adjustment.

1. Oscilloscope (2 channel type)
2. AC Voltmeter

## 2. ADJUSTMENT PROCEDURE

### 2-1: PB. SWITCHING POSITION

CONDITIONS

MODE - PLAYBACK
Input Signal - Standard Test Tape

NOTE

Tracking control should be set at click point.

INSTRUCTIONS

1. Connect CH-1 on the oscilloscope to **TP2001** and CH-2 to **TP4002.**
2. Playback the tape.
3. Adjust **VR2001** so that the waveform of the oscilloscope measures 6.5±0.5(H) at both leading and trailing edges.
**(Refer to Fig. 2-1-A, B)**

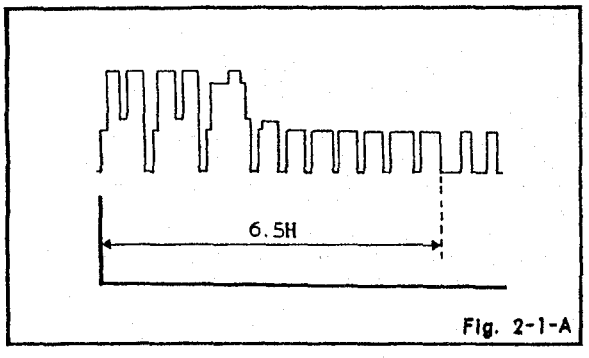


Fig. 2-1-A

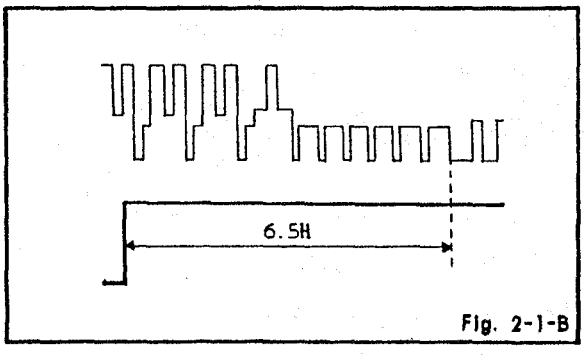


Fig. 2-1-B

### 2-2: PLAYBACK LUMINANCE LEVEL

CONDITIONS

MODE - PLAYBACK
Input Signal - Color Bar Test Tape

NOTE

Video out of the unit should be terminated with 75 ohm load.

INSTRUCTIONS

1. Connect the oscilloscope to **TP4002.**
2. Playback the tape.
3. Adjust **VR4003** so that the signal becomes 1.0±0.05Vp-p as shown in **Fig. 2-2.**

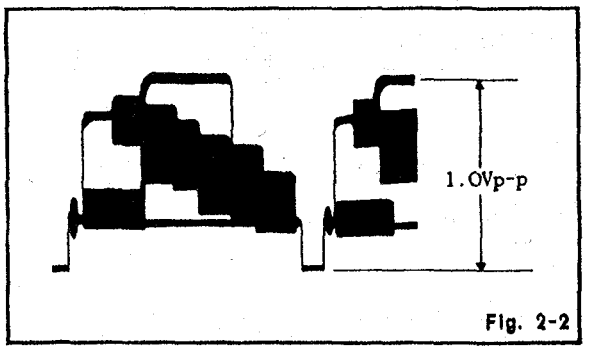


Fig. 2-2

### 2-3: NOISE CANCEL

CONDITIONS

MODE - PLAYBACK
Input Signal - Color Bar Test Tape

INSTRUCTIONS

1. Connect CH-1 of the oscilloscope to **TP4003** and CH-2 on the oscilloscope to **TP4004.**
2. Reverse the waveform for CH-2 with an inverter and put both the waveforms for CH-1 and CH-2 together by pressing the ADD SW on the oscilloscope.
3. Adjust the **VR4005** so that the waveform of CH-1 is straight as shown in **Fig. 2-3.**

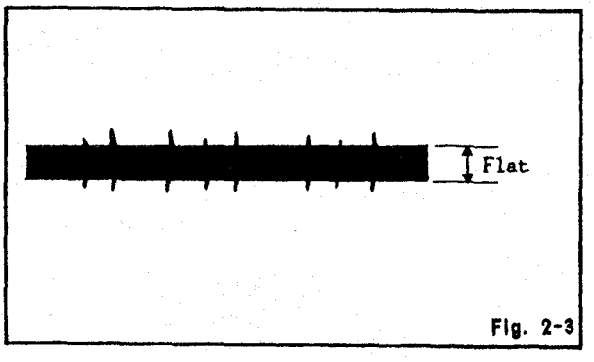


Fig. 2-3

### 2-4: PLAYBACK AUDIO LEVEL

CONDITIONS

MODE - PLAYBACK
Input Signal - Color Bar Test Teap

NOTE

Video out of the unit should be terminated with 47K ohm load.

INSTRUCTIONS

1. Connect the AC voltmeter to **AUDIO OUT.**
2. Playback the tape.
3. Adjust **VR5001** until the value the AC voltmeter will be 230±10mVrms.

# ELECTRICAL ADJUSTMENTS

## 2-5-A: SECAM IDENTIFICATION (1)

CONDITIONS

MODE - PLAYBACK
Input signal - SECAM RF signal

INSTRUCTIONS

1. Connect CH-1 on the oscilloscope to **TP3701** and CH-2 to **TP4002.**
2. Adjust **L3702** so that peak of waveform "A" and leading edge of video signal of waveform "B" may become same as shown in **Fig. 2-4.**

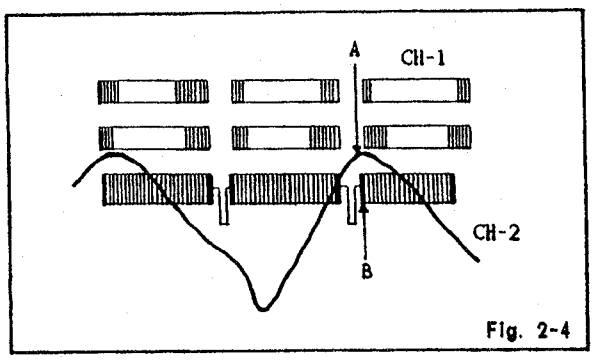


Fig. 2-4

## 2-5-B: SECAM IDENTIFICATION (2)

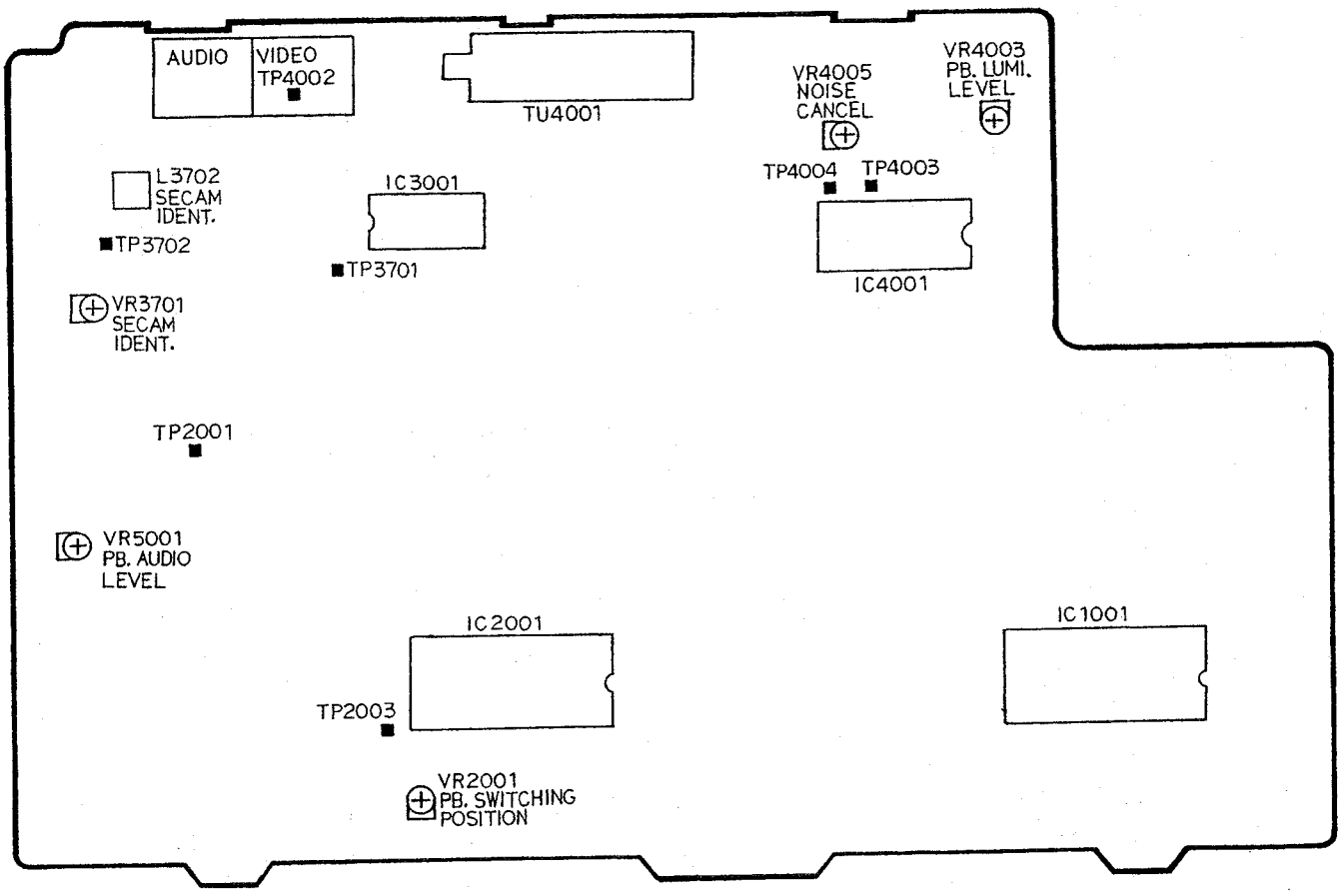
CONDITIONS

MODE - PLAYBACK
Input signal - SECAM RF signal

INSTRUCTIONS

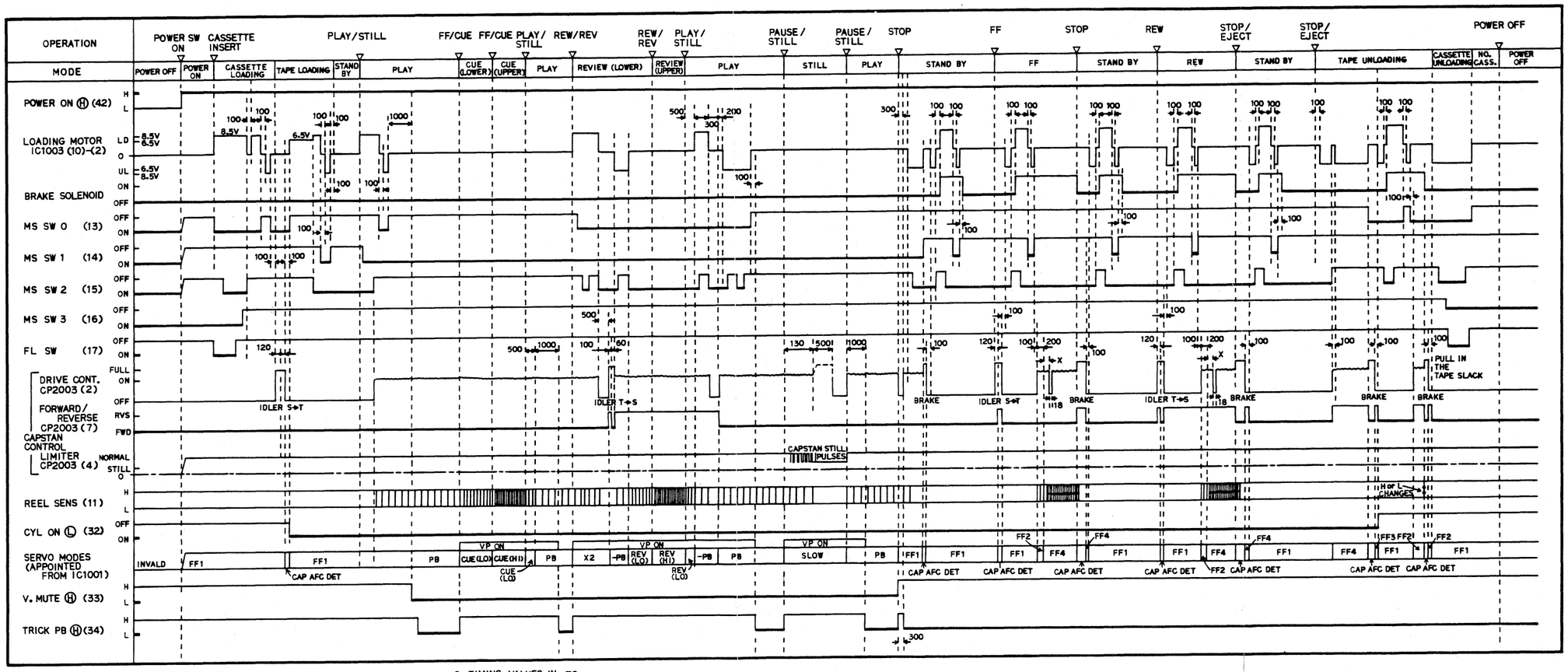
1. Connect the oscilloscope to **TP3702.**
2. Receive SECAM RF signal at 33dB.
3. At this time, adjust **TP3702** to High Level with **VR3701**
4. Next, check that the **TP3702** will indicate Low Level with adjusting the output level to 30dB.
5. Receiving the PAL signal, check that the **TP3702** will indicate Low Level regardless of output strength.

# MAJOR COMPONENTS LOCATION GUIDE



MAIN P.C.BOARD

# TIMING CHART




NOTE : 1. SERVO MODE SET

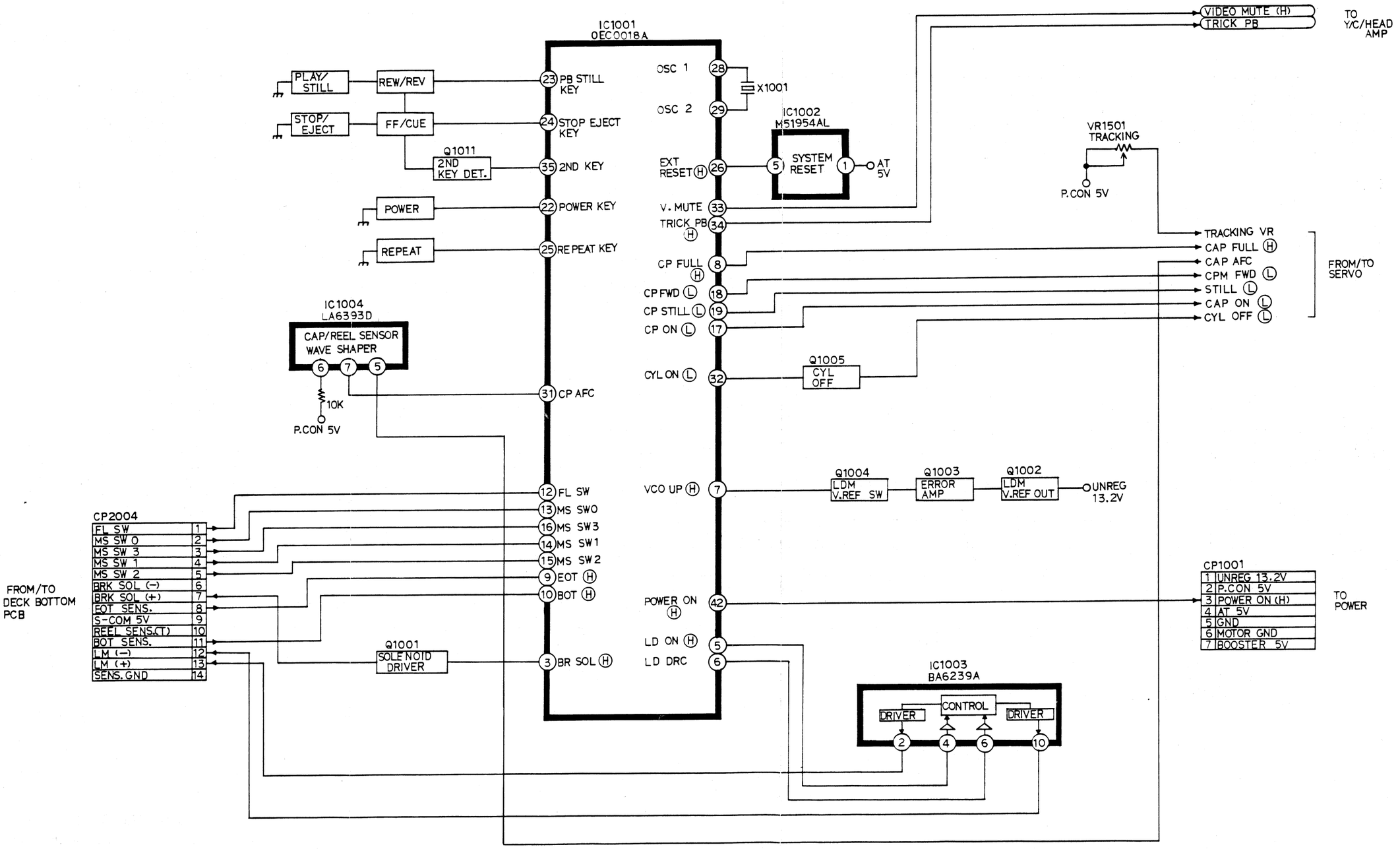
2. TIMING VALUES IN ms

3. TIMING WAVE FORM

HIGH — STAY HIGH or LOW

LOW — ALTERNATELY HIGH and LOW

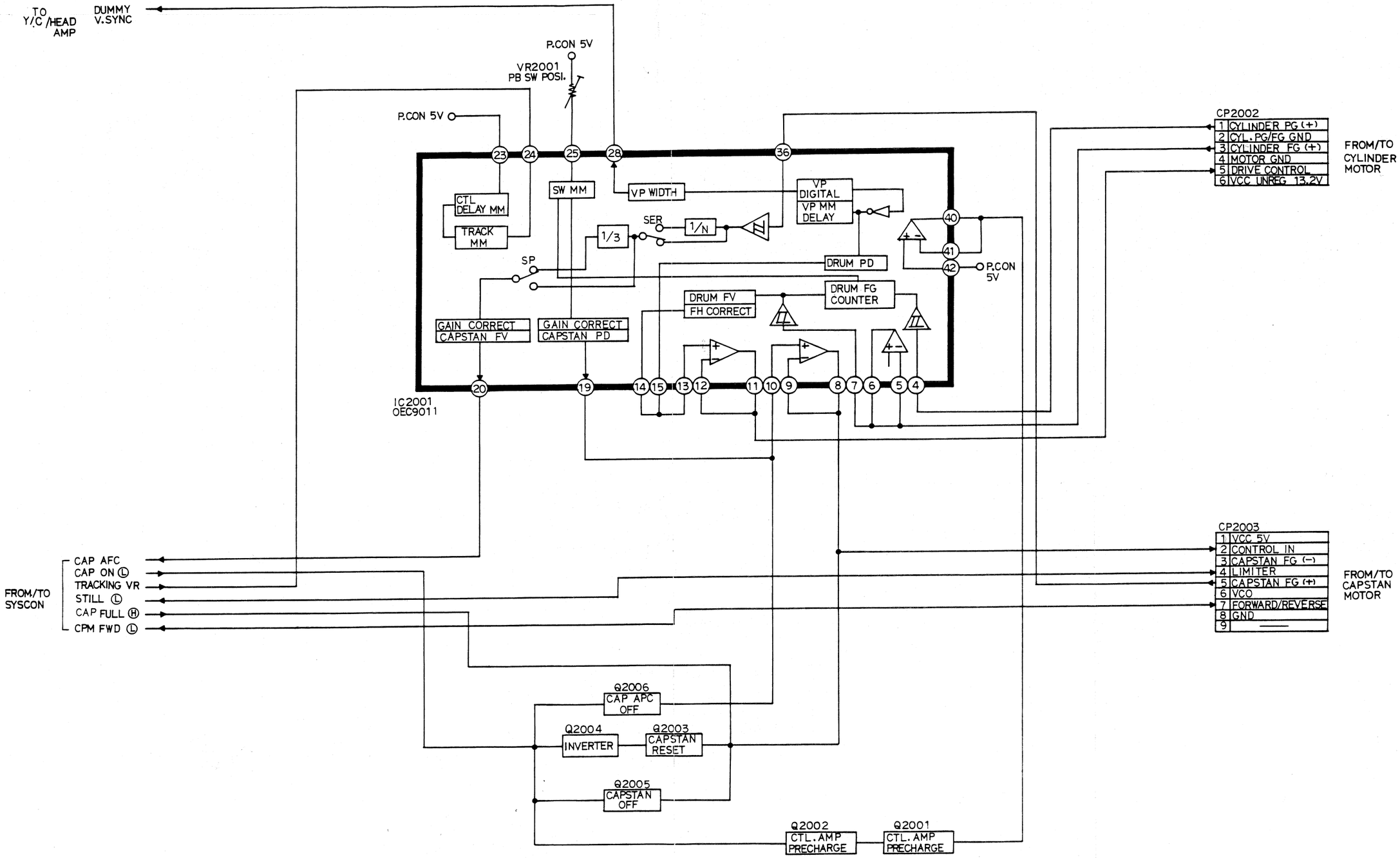
# CONTROL/SYSTEM CONTROL BLOCK DIAGRAM




## CONTROL/SYSTEM CONTROL BLOCK DIAGRAM

2-3529

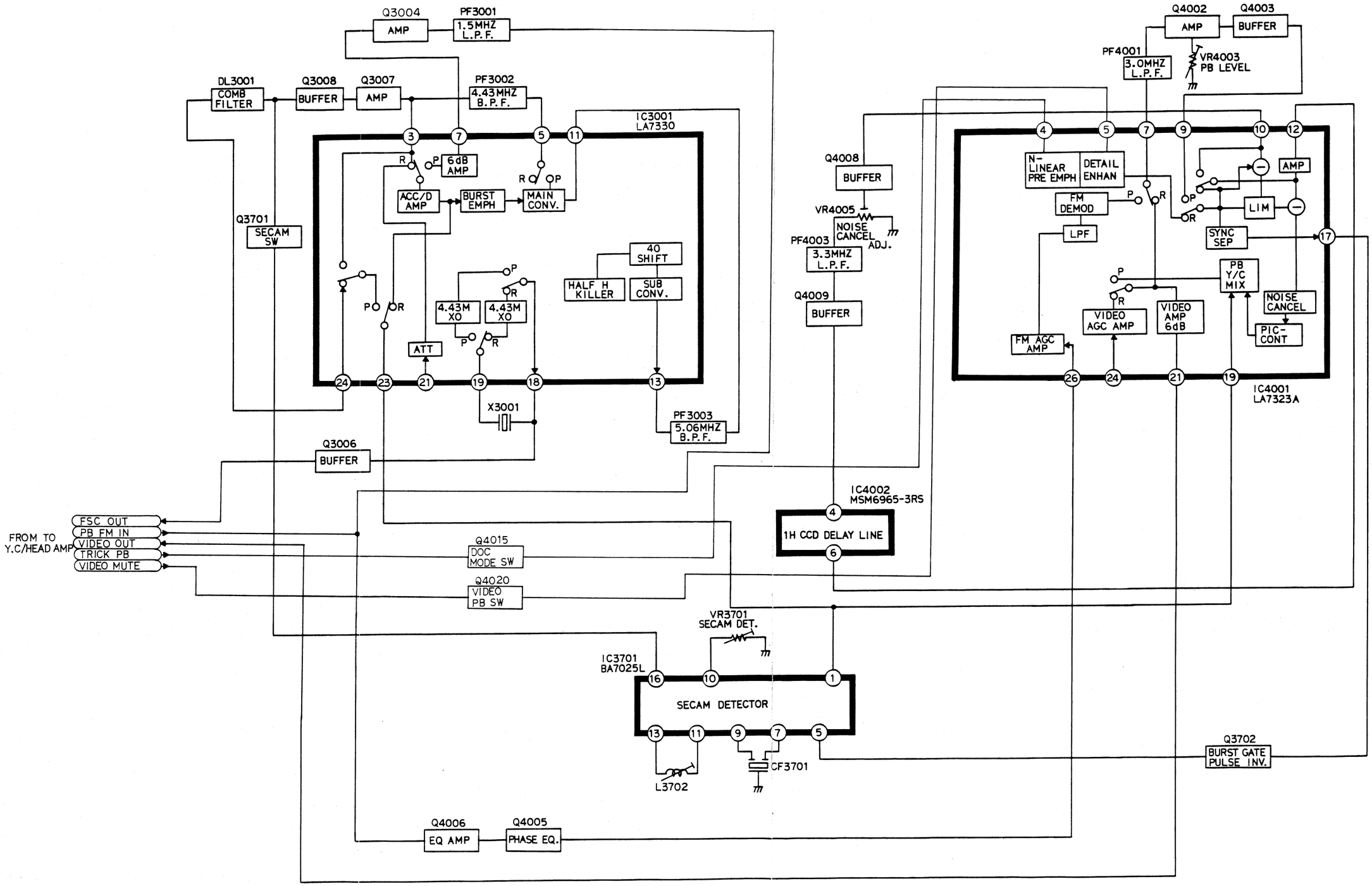
# SERVO BLOCK DIAGRAM




## SERVO BLOCK DIAGRAM

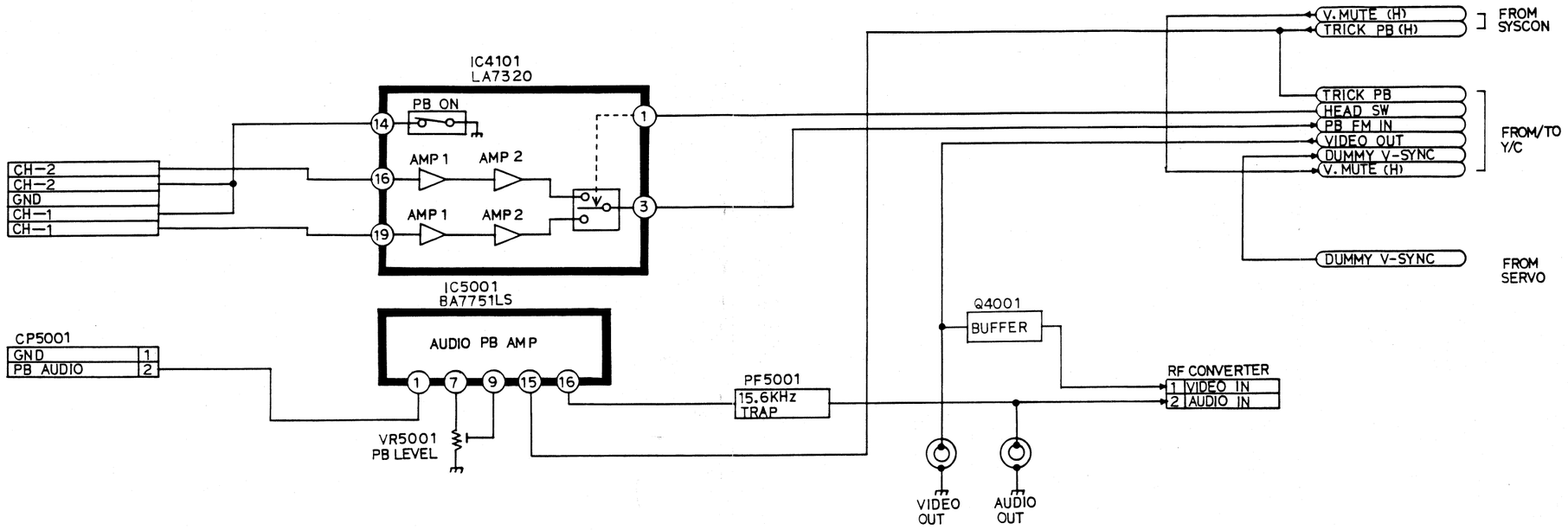
2-3530

# Y.C. BLOCK DIAGRAM

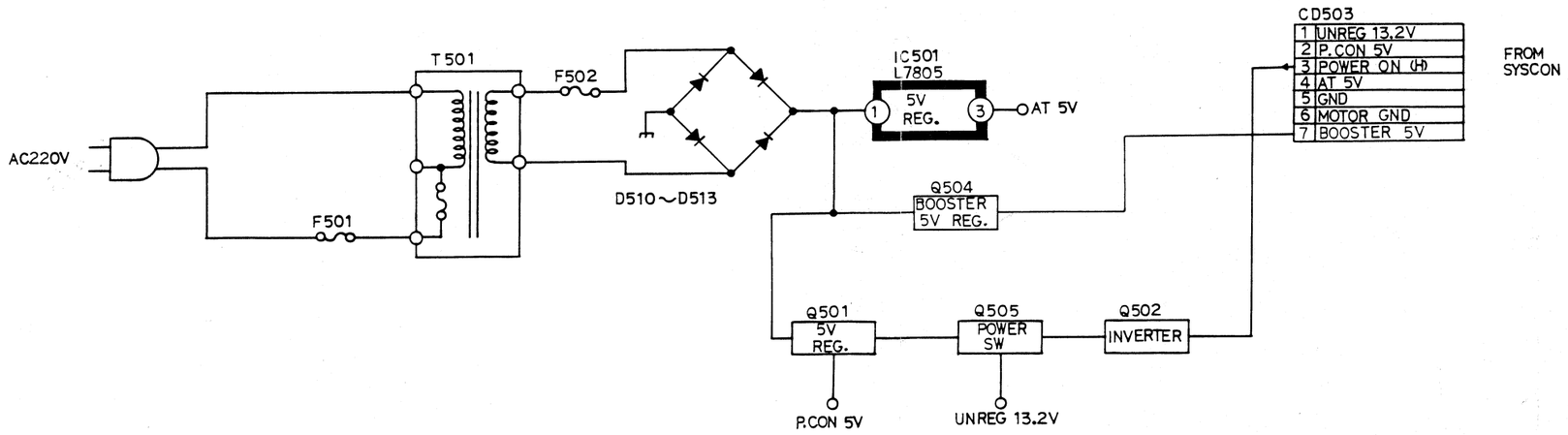



Y.C. BLOCK DIAGRAM

## Y.C./HEAD AMP/AUDIO BLOCK DIAGRAM

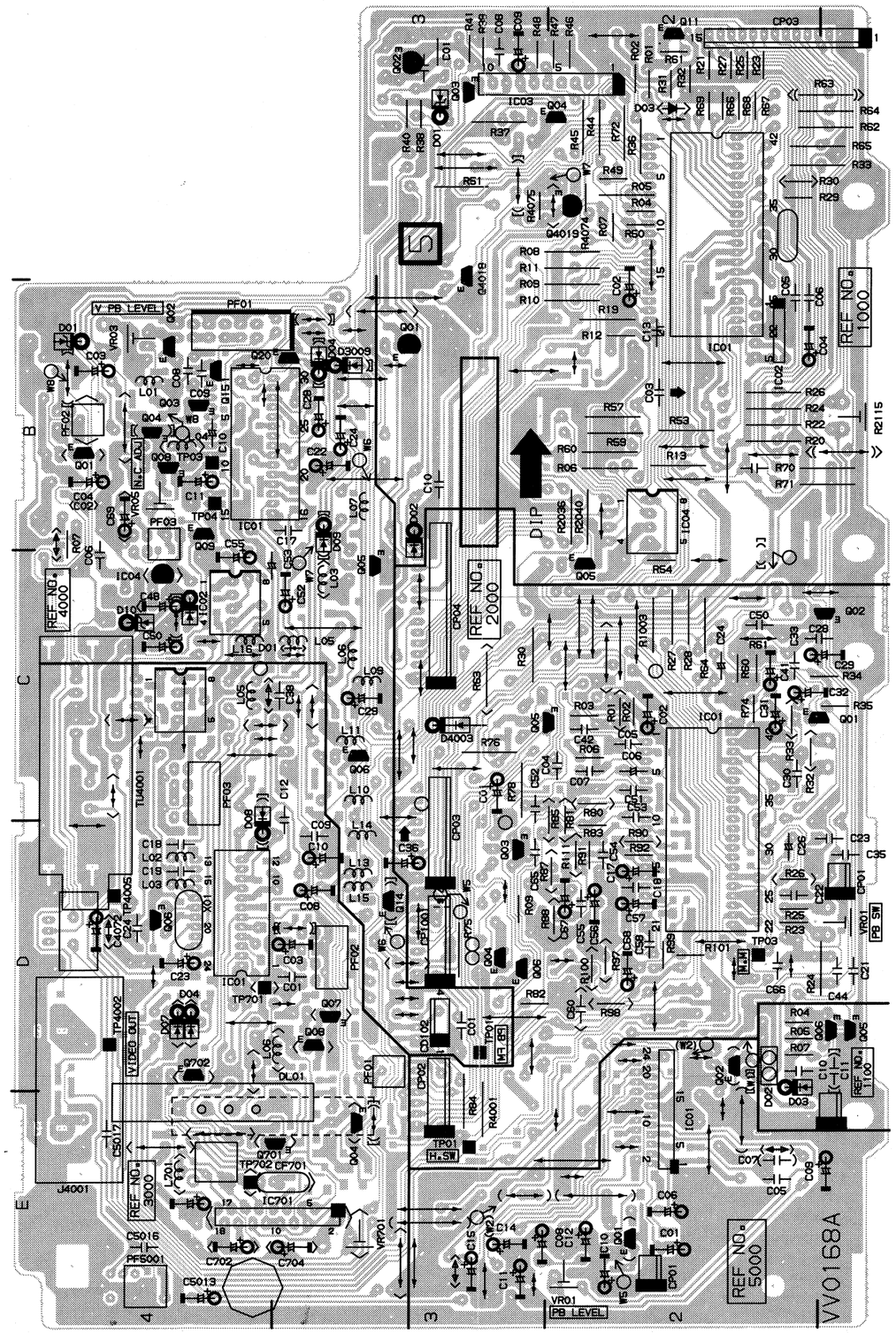



## POWER SUPPLY BLOCK DIAGRAM

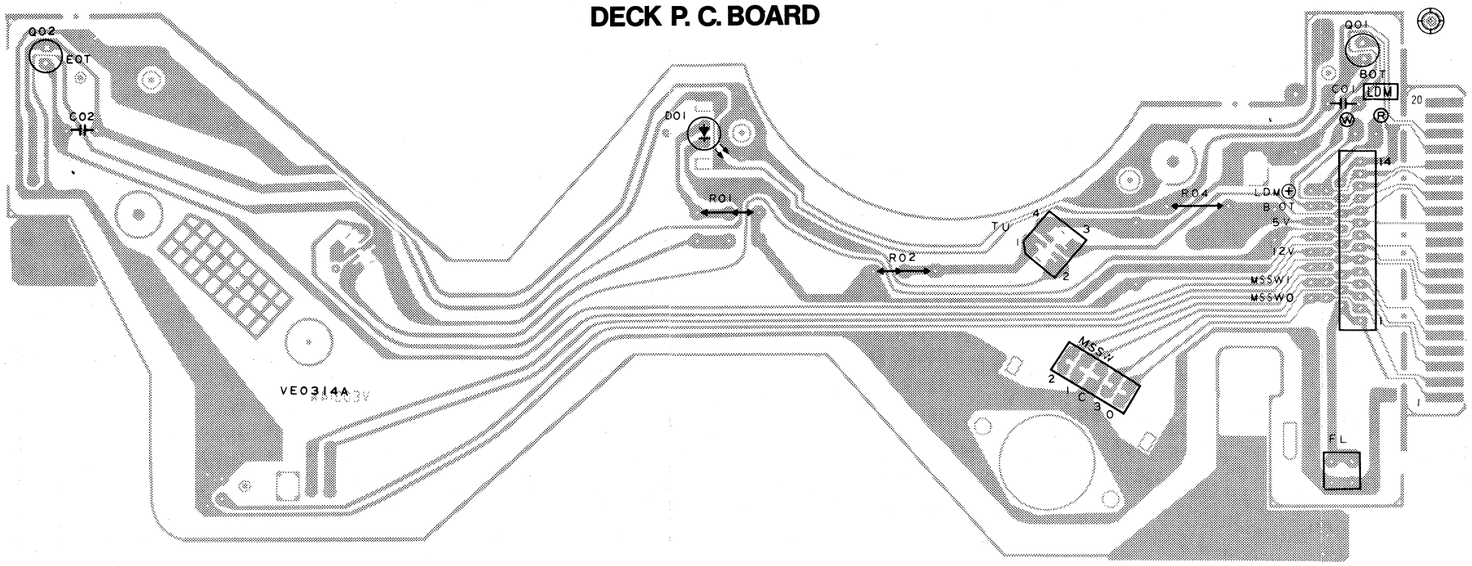


# MAIN P. C. BOARD

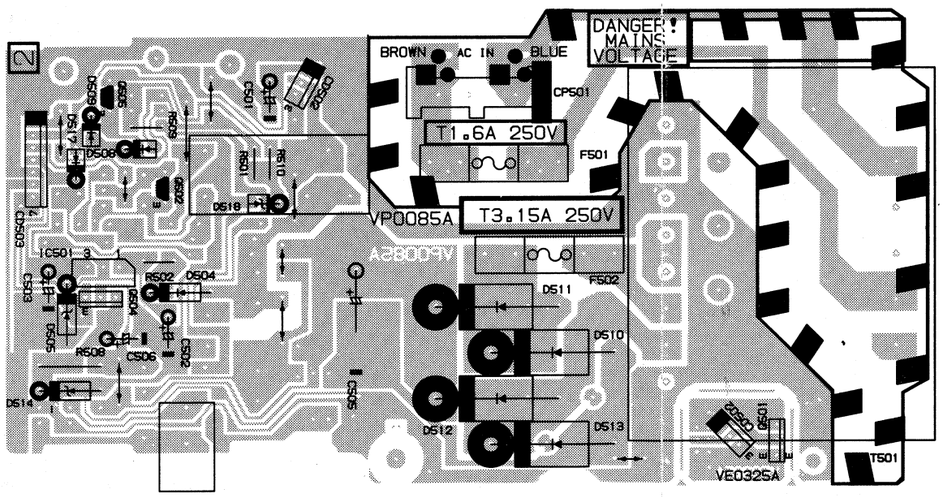
## COMPONENT SIDE


REF. NO. 1000
REF. NO. 2000
REF. NO. 3000
REF. NO. 4000
REF. NO. 5000
REF. NO. 100
V. PB LEVEL
VR02
PF01
D01
C03
C09
C08
Q15
C10
Q03
W8
Q04
W9
PF02
Q01
TP03
Q08
N.C. ADJ
VR05
C04
C02
C11
TP04
PF03
Q09
C55
C17
IC01
IC04
C46
D10
C50
L05
L06
L09
C29
L11
Q06
L10
C12
C09
L14
C10
L13
L15
C18
L02
C19
L03
TU4001
PF03
D08
C24
TP4005
Q08
XO1
C08
C23
IC01
TP701
C03
C01
D04
D07
Q07
D08
TP4002
VIDEO OUT
Q702
DL01
PF01
Q701
TP702
CF701
L701
J4001
IC701
C5016
PFS001
C702
C704
C5013
VR01
PB LEVEL
C01
C14
C15
C11
C02
C16
C17
C06
C05
C09
C07
C01
D01
C01
C02
C04
C03
C05
C06
C07
C08
C09
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
C21
C22
C23
C24
C25
C26
C27
C28
C29
C30
C31
C32
C33
C34
C35
C36
C37
C38
C39
C40
C41
C42
C43
C44
C45
C46
C47
C48
C49
C50
C51
C52
C53
C54
C55
C56
C57
C58
C59
C60
C61
C62
C63
C64
C65
C66
C67
C68
C69
C70
C71
C72
C73
C74
C75
C76
C77
C78
C79
C80
C81
C82
C83
C84
C85
C86
C87
C88
C89
C90
C91
C92
C93
C94
C95
C96
C97
C98
C99
C100
R01
R02
R03
R04
R05
R06
R07
R08
R09
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R26
R27
R28
R29
R30
R31
R32
R33
R34
R35
R36
R37
R38
R39
R40

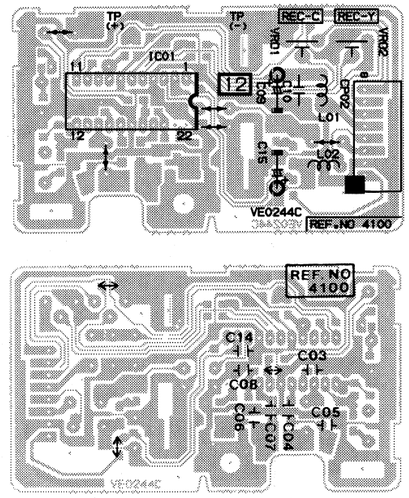
## DECK P. C. BOARD




## POWER SUPPLY/TRANSISTOR P. C. BOARD



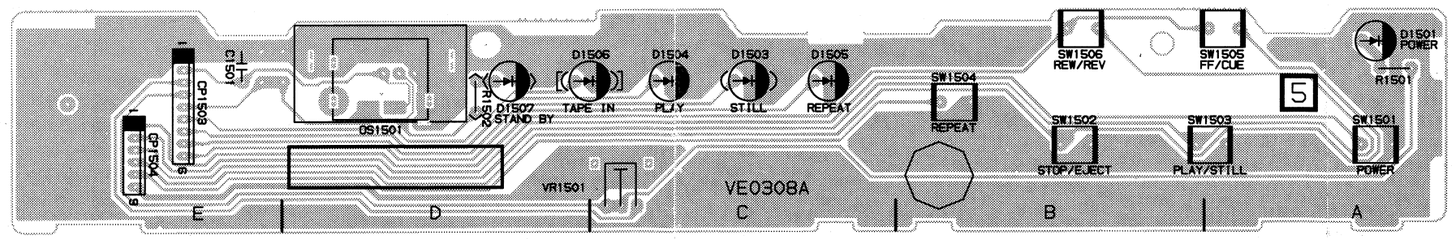

## HEAD AMP P. C. BOARD



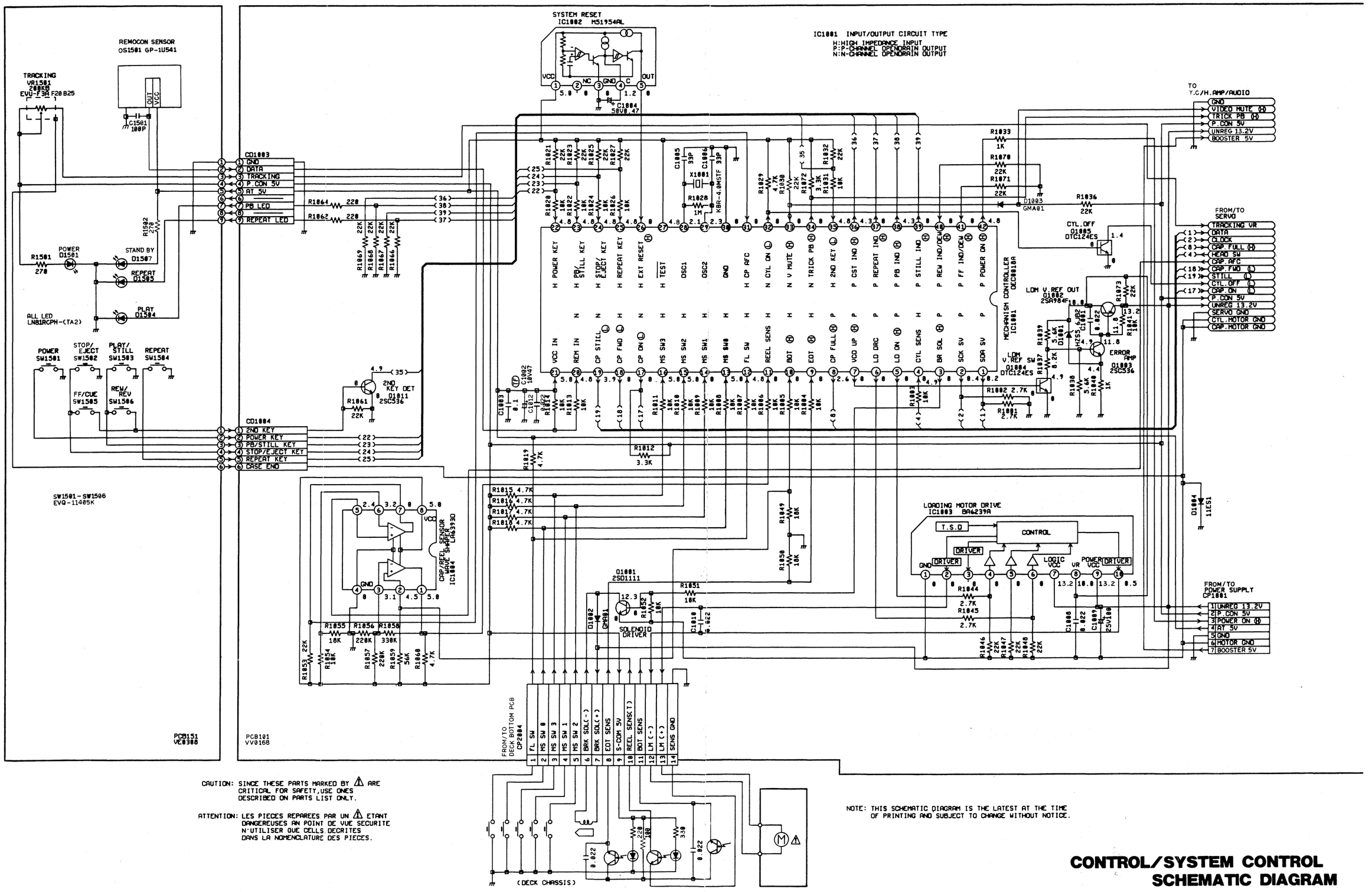

**COMPONENT SIDE**

**SOLDER SIDE**

## CONTROL P. C. BOARD



# CONTROL/SYSTEM CONTROL SCHEMATIC DIAGRAM




CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED ON PARTS LIST ONLY.

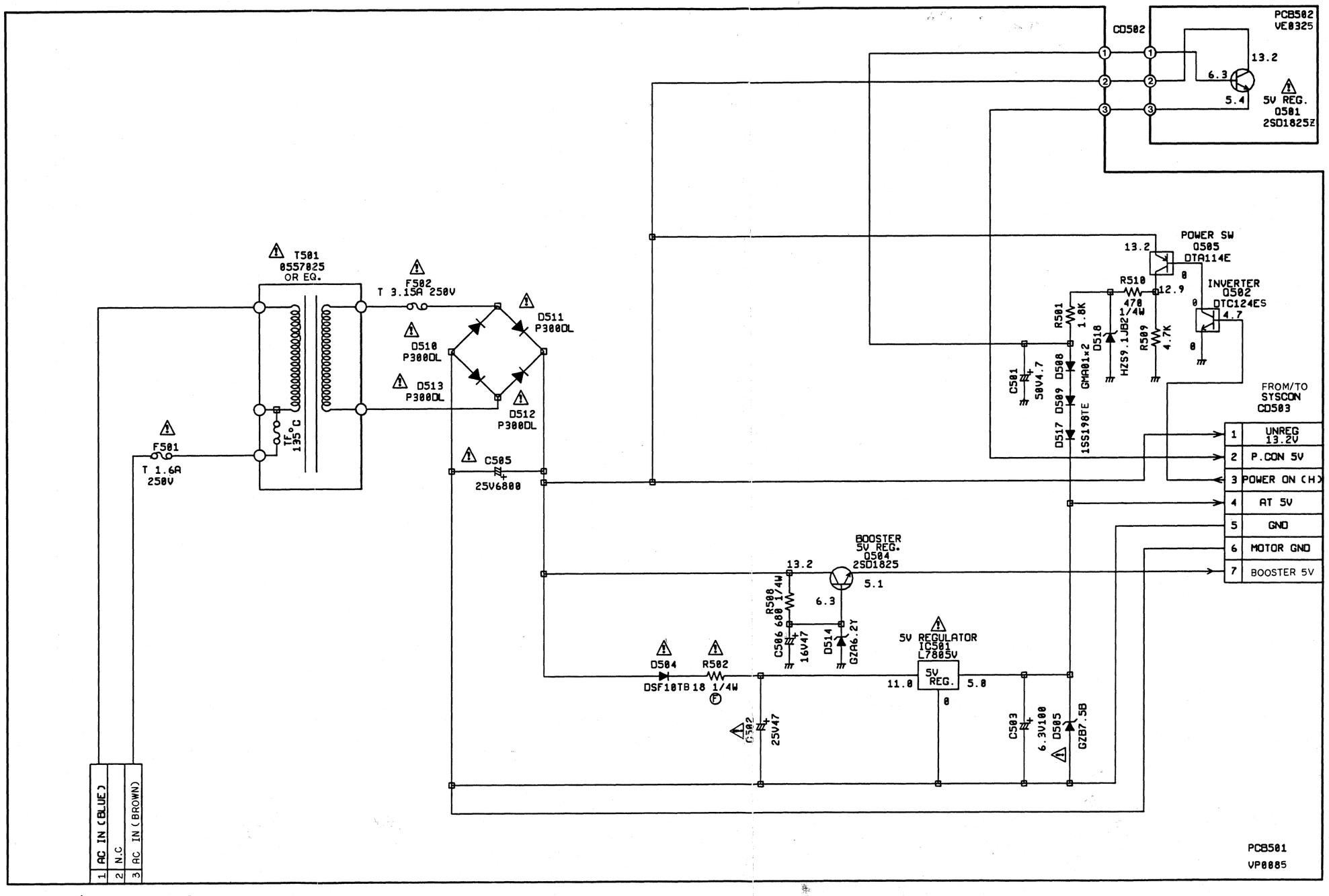
ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

**CONTROL/SYSTEM CONTROL SCHEMATIC DIAGRAM**

1-8784

# POWER SUPPLY SCHEMATIC DIAGRAM




NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

⚠ AC 220V IN 50HZ

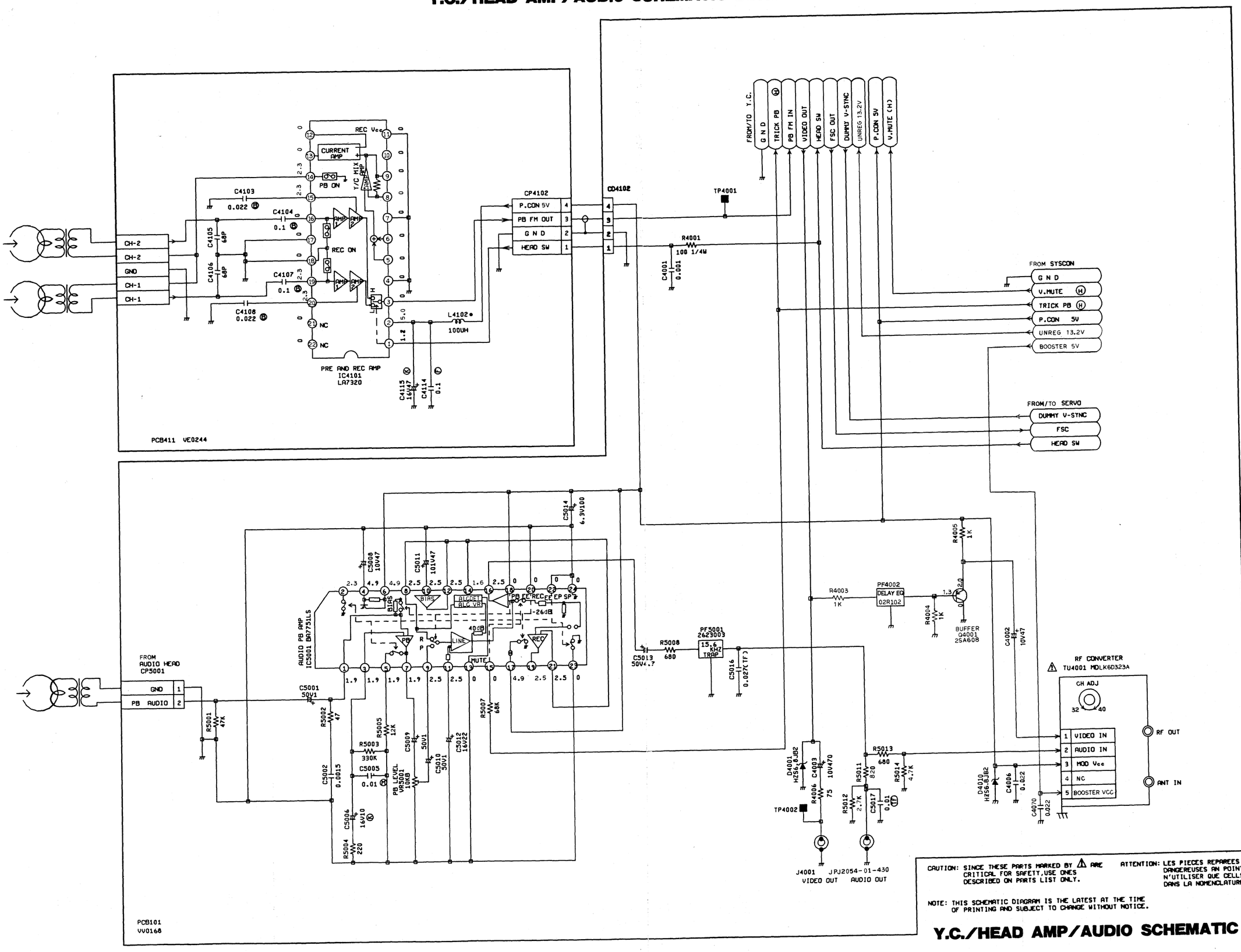
ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES.

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED ON PARTS LIST ONLY.

POWER SUPPLY SCHEMATIC DIAGRAM

2-3533

# Y.C./HEAD AMP/AUDIO SCHEMATIC DIAGRAM



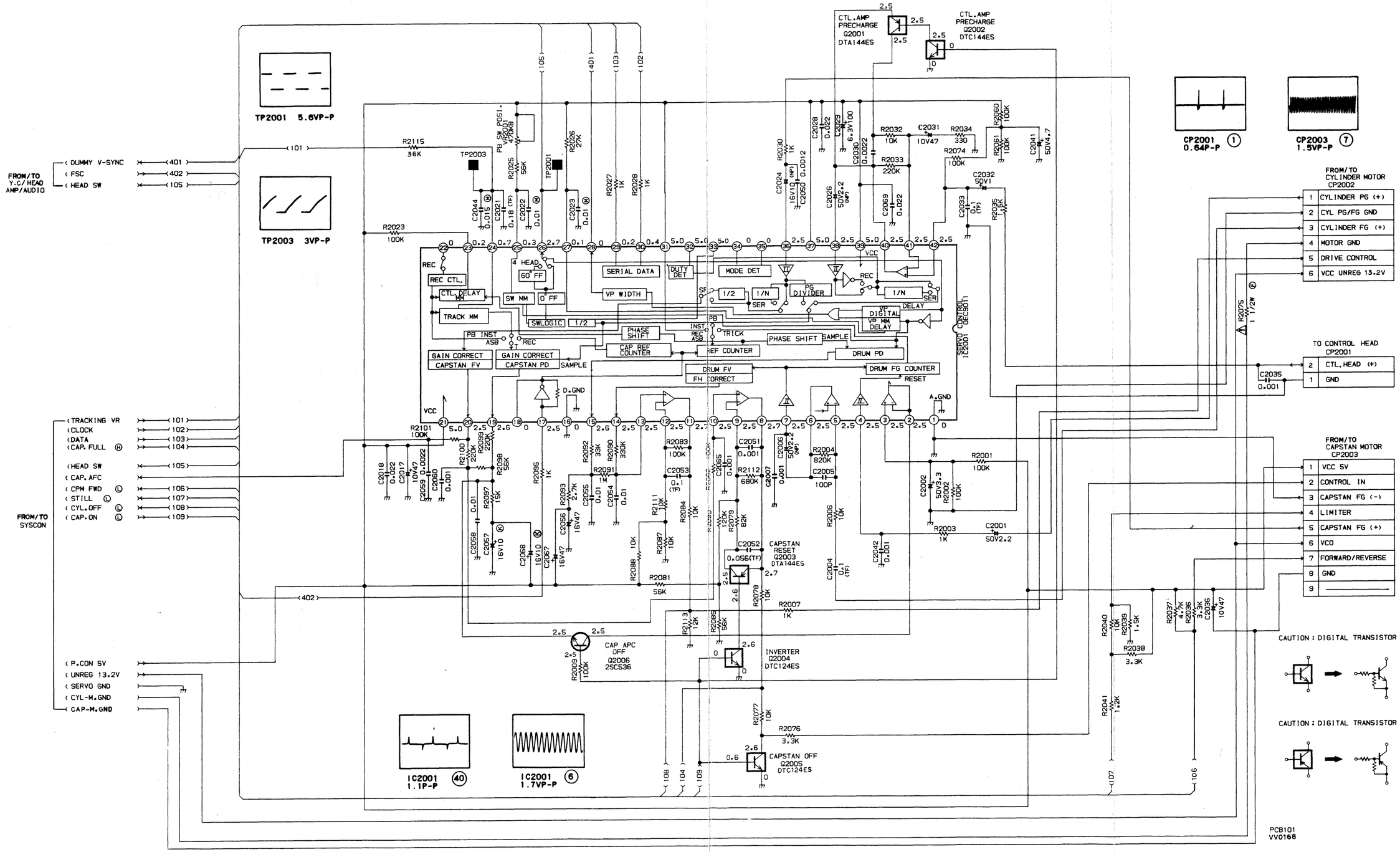

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED ON PARTS LIST ONLY.

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AU POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

Y.C./HEAD AMP/AUDIO SCHEMATIC DIAGRAM

# SERVO SCHEMATIC DIAGRAM




CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY , USE ONES DESCRIBED ON PARTS LIST ONLY.

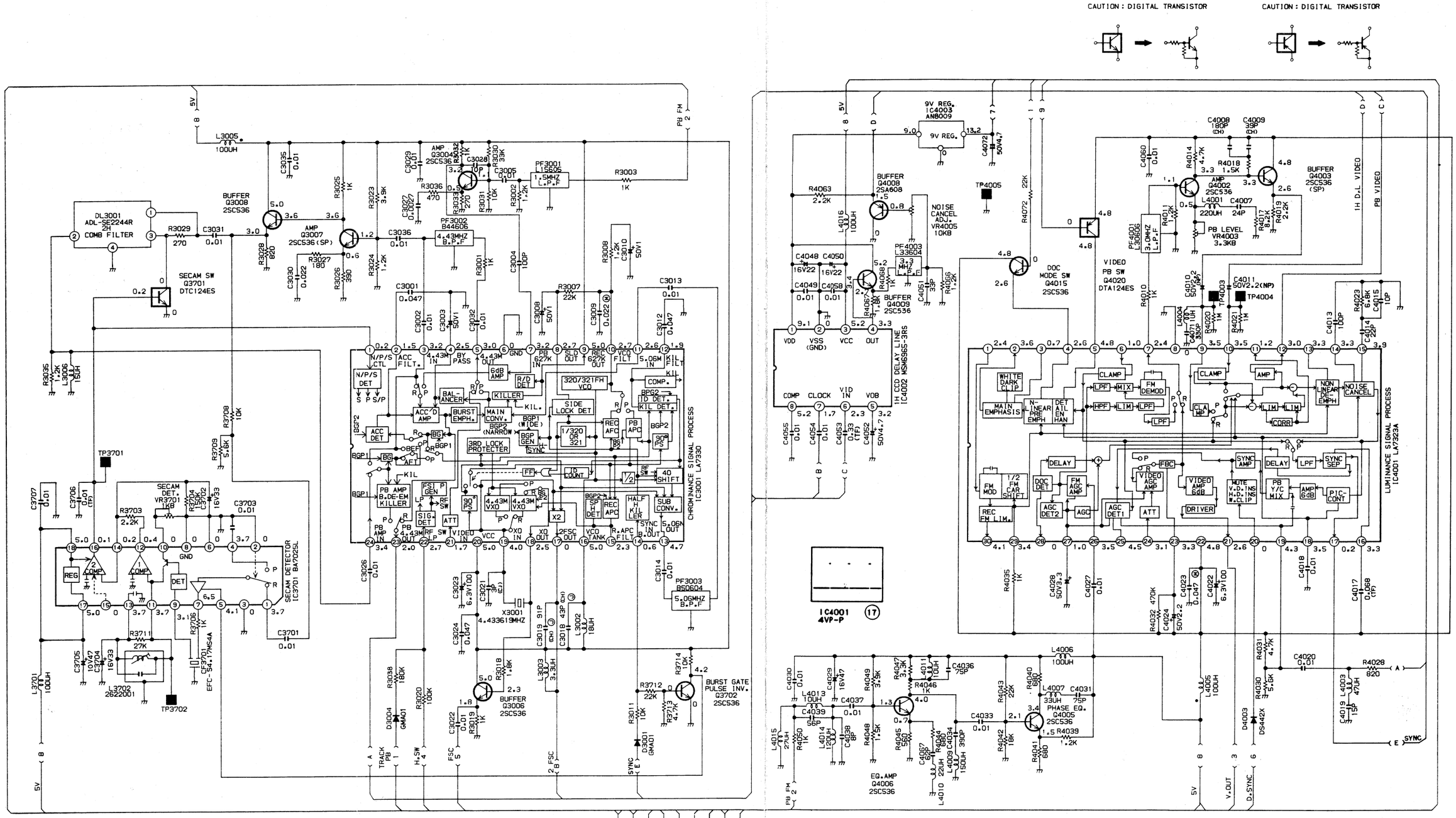
ATTENTION : LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLES DECRITES DANS LA NOMENCLATURE DES PIECES.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

SERVO SCHEMATIC DIAGRAM

1-8785

# Y.C. SCHEMATIC DIAGRAM

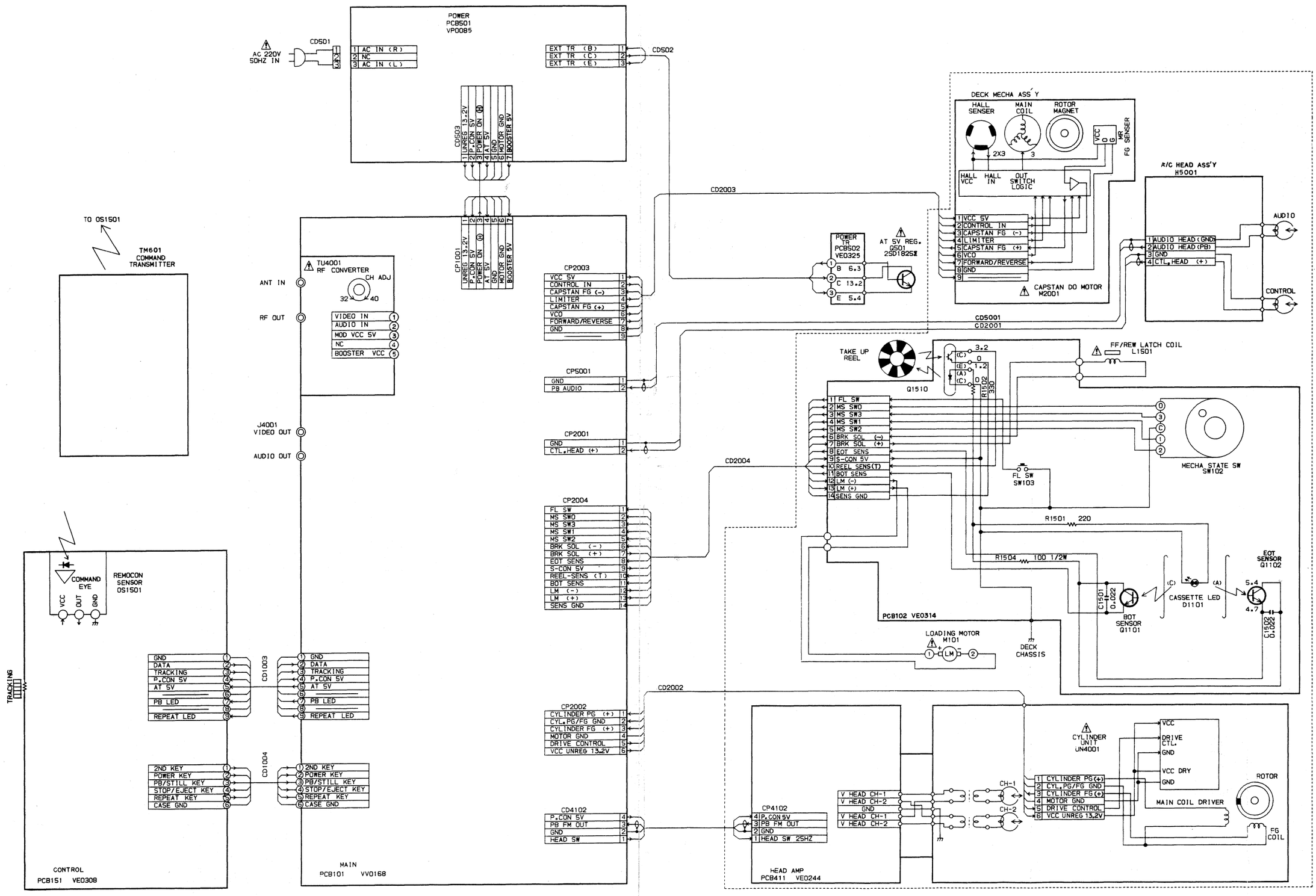



NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

## Y.C. SCHEMATIC DIAGRAM

1-8786

# INTERCONNECTION DIAGRAM



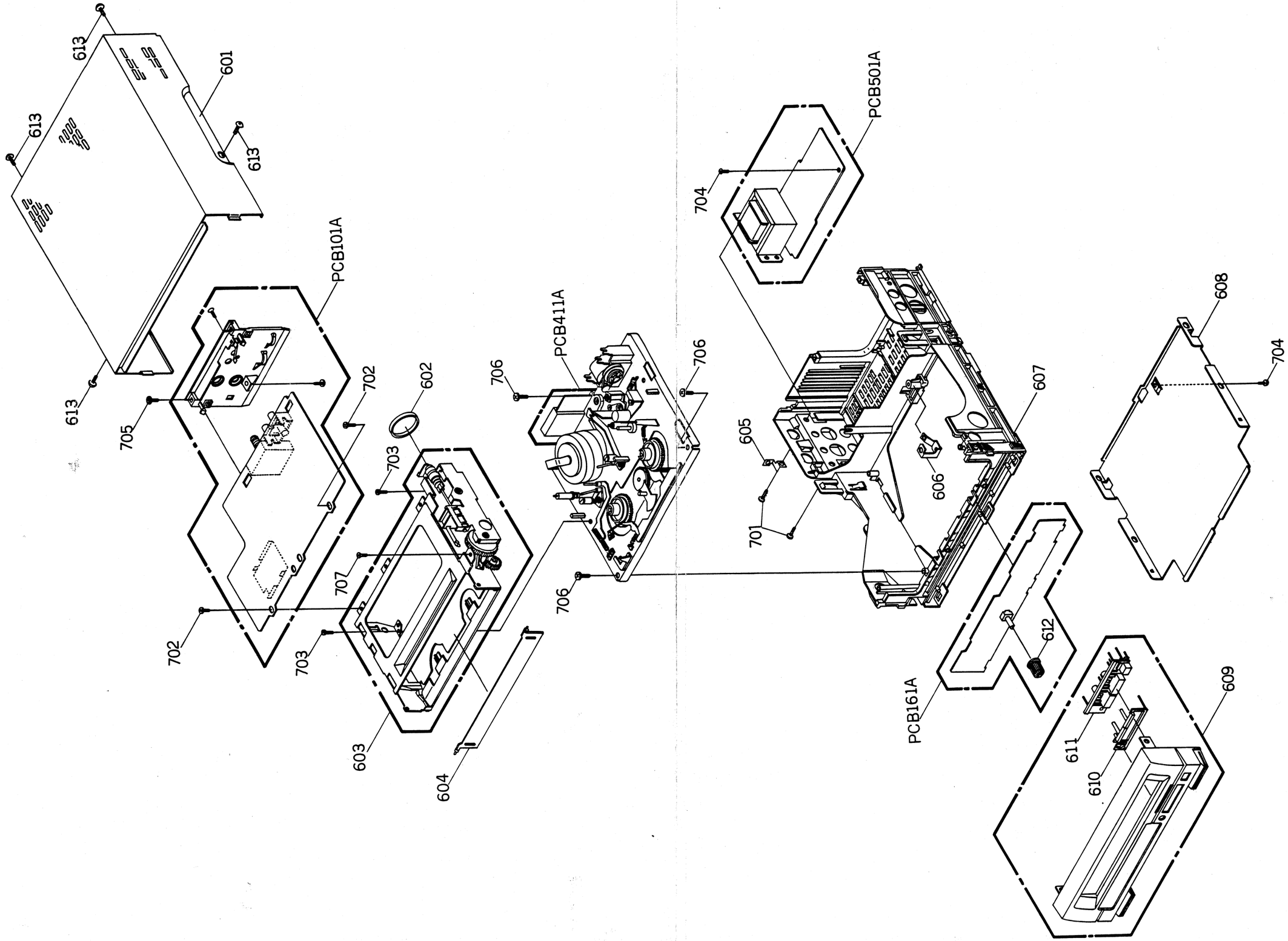

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY , USE ONES DESCRIBED ON PARTS LIST ONLY.

ATTENTION : LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLES DECRITES DANS LA NOMENCLATURE DES PIECES.

**INTERCONNECTION DIAGRAM**

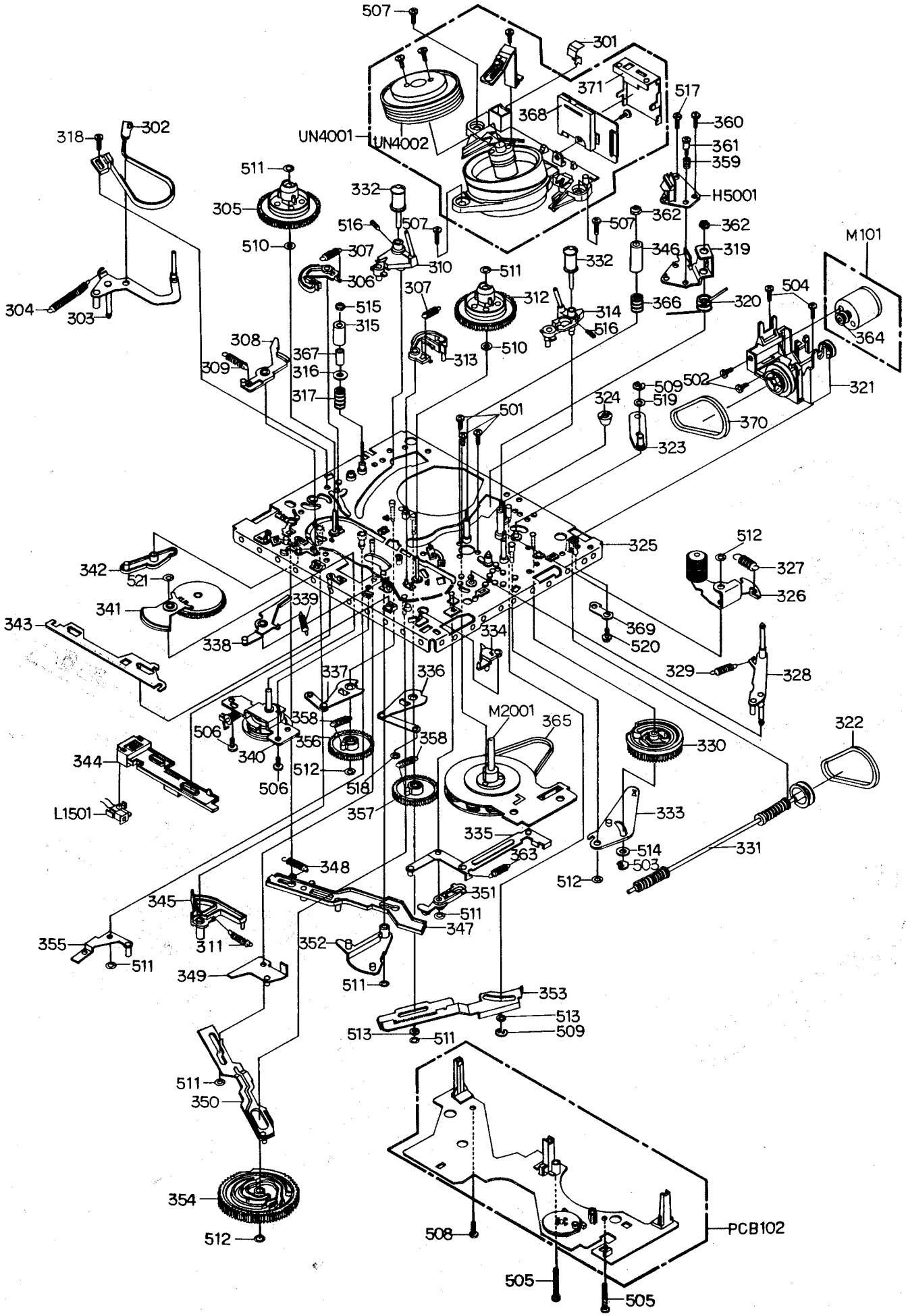
1-8783



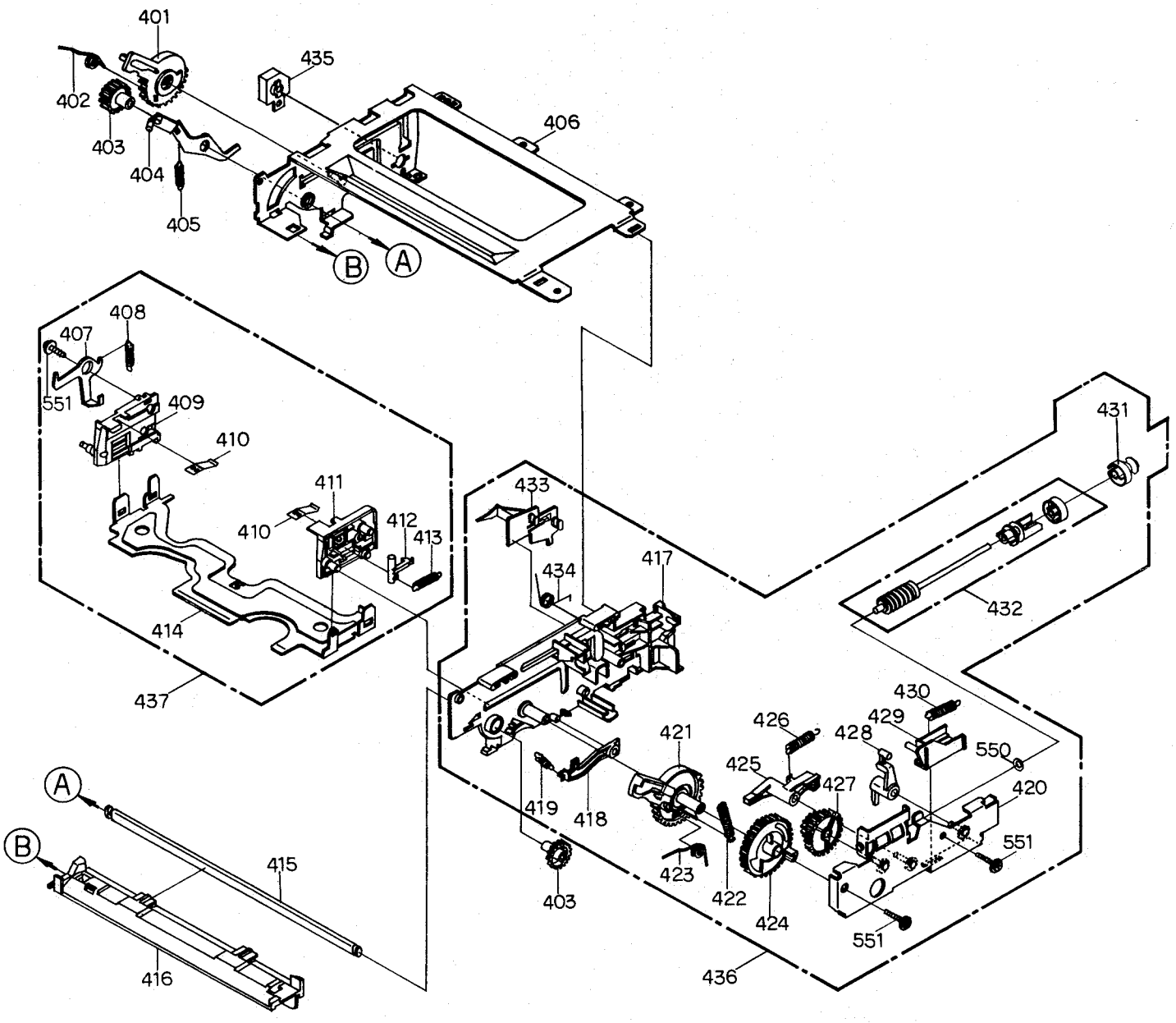

MECHANICAL EXPLODED VIEW

1-8788

# DECK EXPLODED VIEW



# DECK EXPLODED VIEW



| REF.NO | PART NO | DESCRIPTION |
|---|---|---|
| 601 | 702JSS0046 | CABINET TOP |
| 602 | 789JRA0001 | BELT,FRONT LOADING |
| 603 | A44802A650 | FRONT LOADING UNIT(FL-6) |
| 604 | 7230003383 | FLAP |
| 605 | 753WSA0007 | PLATE,TRANS EARTH |
| 606 | 753WSA0008 | PLATE,EARTH |
| 607 | 702JPA0378 | CABINET,INSIDE |
| | | SHEET,RATING |
| 608 | 702JSA0033 | CABINET,BOTTOM |
| 609 | A45105A720 | CABINET,FRONT ASS'Y |
| 610 | 735JPA0499 | BUTTON DECK(B) |
| 611 | 735JPA0498 | BUTTON DECK(A) |
| 612 | 732WPA0003 | KNOB,TRACKING |
| 613 | 788JSE0014 | TAPPING(BO) TRUSS 4*12 BK |
| 701 | 8102240804 | BIND M4*8 CH |
| 702 | 8107230604 | TAP TITE(S) BIND 3*6 CH |
| 703 | 8107230804 | TAP TITE(S) BIND 3*8 CH |
| 704 | 8110630804 | TAP TITE(P) BRAZIER 3*8 CH |
| 705 | 8117D30A04 | TAPPING(BO) WH8 BRAZIER 3*10 CH |
| 706 | 8117140A24 | TAPPING(BO) PAN 4*12 CH |
| --- | JIACVAA02B | GUARANTEE CARD |
| --- | J4300120A | CAUTION SHEET |
| --- | J4300128A | WARNING SHEET |
| --- | J4510501A | INSTRUCTION BOOK |
| --- | 791JHA0070 | GIFT SHEET |
| --- | 792JHA0194 | PACKAGE |
| --- | 793JCD2061 | GIFT,BOX |

# DECK REPLACEMENT PARTS LIST

| REF.NO | PART NO | DESCRIPTION |
|---|---|---|
| 301 | 850P500023 | SPRING,TR. |
| 302 | 850A600093 | TENSION,BAND ASS'Y |
| 303 | 850A400077 | TENSION,ARM ASS'Y |
| 304 | 850P800141 | SPRING,TENSION ARM |
| 305 | 850A200028 | REEL DISK S ASS'Y |
| 306 | 850A600117 | MAIN BRAKE S ASS'Y |
| 307 | 850P800168 | SPRING,MAIN BRAKE |
| 308 | 850P600309 | ARM,S-S BRAKE |
| 309 | 850P800164 | SPRING SS BRAKE |
| 310 | 850A400079 | BASE,S INCLINED ASS'Y |
| 311 | 850P800171 | SPRING,M-B 3 |
| 312 | 850A200029 | REEL DISK T ASS'Y |
| 313 | 850A600118 | MAIN BRAKE T ASS'Y |
| 314 | 850A400080 | BASE,T INCLINED ASS'Y |
| 315 | 850P500046 | ROLLER,IMPEDANCE |
| 316 | 850P600274 | FLANGE,P1 |
| 317 | 850P800075 | SPRING,P1 |
| 318 | 868501H804 | TAP TITE(S) PAN W6 3*8 CH |
| 319 | 850P500042 | BASE,AC HEAD 2 |
| 320 | 850P800150 | SPRING,AC HEAD BASE |
| 321 | 850A600115 | LOADING MOTOR BOX ASS'Y |
| 322 | 850P600317 | BELT,LOADING MOTOR |
| 323 | 850A500008 | P-R,LEVER ASS'Y |
| 324 | 850P600314 | NUT,ADJUST X |
| 325 | 850A000027 | MAIN CHASSIS ASS'Y |
| 326 | 850A400073 | PINCH ROLLER ARM ASS'Y |
| 327 | 850P800149 | SPRING,P-R ARM |
| 328 | 850A400078 | LIMITER,POST ARM ASS'Y |
| 329 | 850P800148 | SPRING,L-P ARM |
| 330 | 850P600323 | CAM 1 |
| 331 | 850A600114 | WORM ASS'Y |
| 332 | 850A400085 | G-ROLLER ASS'Y |
| 333 | 850A300031 | LOADING,LEVER 2 ASS'Y |
| 334 | 850P600311 | LEVER,SUB BRAKE |
| 335 | 850A900083 | LEVER FRONT LOADING ASS'Y |
| 336 | 850A300030 | LOADING,ARM T ASS'Y |
| 337 | 850A300029 | LOADING,ARM S ASS'Y |
| 338 | 850A600107 | T-S BRAKE ASS'Y |
| 339 | 850P800165 | SPRING TS BRAKE |
| 340 | 850A200027 | CLUTCH ASS'Y |
| 341 | 850A200026 | IDLER ASS'Y |
| 342 | 850P600300 | MAIN BRAKE LEVER 1 |
| 343 | 850P600310 | ACTUATOR,SUB BRAKE |
| 344 | 850A600113 | CLUTCH ACTUATOR ASS'Y |
| 345 | 850P600303 | LEVER TENSION |
| 346 | 850P600312 | POST,P4 |
| 347 | 850P600299 | SLIDE,MAIN BRAKE |
| 348 | 850P800169 | SPRING,M-B SLIDE |
| 349 | 850A600109 | M-B 2 LEVER ASS'Y |
| 350 | 850A600108 | T-A SLIDE ASS'Y |
| 351 | 850P600301 | LEVER,LIMITER POST |
| 352 | 850P600302 | LEVER,CLUTCH ACTUATOR |
| 353 | 850P300112 | SLIDE,LOADING 2 |
| 354 | 850P600327 | CAM 2 |
| 355 | 850A600099 | M-B 3 LEVER ASS'Y |
| 356 | 850P300114 | GEAR,LOADING S |
| 357 | 850P300115 | GEAR,LOADING T |
| 358 | 850P800147 | SPRING,LOADING GEAR |
| 359 | 850P800167 | SPRING,AZIMUTH |
| 360 | 8144J30604 | CONEHEAD SCREW M3*6 CH |
| 361 | 8146230A14 | JOINT SCREW BIND M3*11 CH |
| 362 | 850P500010 | ADJUST NUT |
| 363 | 850P800170 | SPRING,FRONT LOADING LEVER |
| 364 | 850P600313 | PULLEY,LOADING MOTOR |
| 365 | 850P600277 | BELT,REEL |
| 366 | 850P800146 | SPRING,P4 |
| 367 | 850P600273 | SLEEVE,P1 |
| 368 | 850PAA0080 | SHIELD,CASE |
| 369 | 850P000262 | BRACKET,WORM 3 |
| 370 | 789JRA0001 | BELT,FRONT LOADING |
| 371 | 850PAA0112 | SHIELD,LID 6 |
| 401 | 850P900457 | GEAR,LINK L |
| 402 | 850P800175 | SPRING,LINK GEAR L |
| 403 | 850P900358 | GEAR,SYNCHRO |
| 404 | 850P900360 | LEVER,FLAP |
| 405 | 850P900259 | SPRING,FLAP OPENER |
| 406 | 850P900096 | TOP BRACKET ASS'Y |
| 407 | 850P900458 | LOCKER |
| 408 | 850P800154 | SPRING,LOCKER |
| 409 | 850P900349 | CASS.SIDE L |
| 410 | 850P900354 | SPRING,PACK |
| 411 | 850P900444 | CASS.SIDE R A |
| 412 | 850P900365 | REMOVING |
| 413 | 850P800155 | SPRING,REMOVING |
| 414 | 850P900351 | CASS,HOLDER |
| 415 | 850P900267 | SHAFT,SYNCHRO |
| 416 | 850P900455 | TAPE GUIDE PIECE |
| 417 | 850P900445 | BRACKET,SIDE R1A |
| 418 | 850P900361 | LEVER,FRONT LOADING SW. |
| 419 | 850P800158 | SPRING,FRONT LOADING SW.LEVER |
| 420 | 850P900098 | SIDE BRACKET R2 ASS'Y |
| 421 | 850P900456 | GEAR,LINK R |
| 422 | 850P800153 | SPRING,CLUTCH GEAR |
| 423 | 850P800176 | SPRING,LINK GEAR R |
| 424 | 850P900357 | GEAR,CLUTCH |
| 425 | 850P900362 | LEVER,LOCK |
| 426 | 850P800159 | SPRING,LOCK LEVER |
| 427 | 850P900367 | WHEEL |
| 428 | 850P900364 | LEVER,CLUTCH |
| 429 | 850P900363 | LEVER,SLIDE |
| 430 | 850P800160 | SPRING,SLIDE LEVER |
| 431 | 850P900366 | JOINT,PULLEY |
| 432 | 850A900082 | WORM ASS'Y |
| 433 | 850P900446 | OPENER A |
| 434 | 850P800172 | SPRING,OPENER A |
| 435 | 850P900396 | COVER,SENSOR |
| 436 | A44802A640 | SIDE BRACKET R ASS'Y |
| 437 | A44802A690 | CASSETTE HOLDER ASS'Y |
| 501 | 868N71G604 | TAP TITE(S) PAN 2.6*6 CH |
| 502 | 8102130404 | PAN M3*4 CH |
| 503 | 83ETW30060 | E-RING 3.0 |
| 504 | 8107230A44 | TAP TITE(S) BIND 3*14 CH |
| 505 | 8107230A64 | TAP TITE(S) BIND 3*16 CH |
| 506 | 8107230604 | TAP TITE(S) BIND 3*6 CH |
| 507 | 8107230804 | TAP TITE(S) BIND 3*8 CH |
| 508 | 8110230804 | TAP TITE(P) BIND 3*8 CH |
| 509 | 83ETW25000 | E-RING 2.5 |
| 510 | 82Q3154B3N | PW 3.1*5.4*T0.13 |
| | 82Q315403N | PW 3.1*5.4*T0.3 |
| 511 | 82P255504N | PW(CUT) 2.5*5.5*T0.4 |
| 512 | 82P306005N | PW(CUT) 3.1*6.0*T0.5 |
| 513 | 82A3270054 | WASHER 3.1*7.0*T0.5 |
| 514 | 82A4080054 | WASHER 4.3*8.0*T0.5 |
| 515 | 8300720000 | NYLON NUT M2 |
| 516 | 815DJ20302 | SET SCREW 6CUP POINT M2*3 BK |
| 517 | 8145J30601 | SCREW +UPSET M3*6 NI |
| 518 | 83CST35050 | CS RING 3.5 |
| 519 | 82A3070C5N | PW 3.1*7.0*T0.25 |
| 520 | 86817BG804 | TAPPING(BO) WH6 2.6*8 CH |
| 521 | 82P2660C5N | PW(CUT) 2.6*6*T0.25 |
| 550 | 82Q315405N | PW 3.1*5.4*T0.5 |
| 551 | 86817CGA04 | TAPPING(BO) BIND WH6.5 2.6*10 CH |
| C1501 | CH4FF03H4Z | CC 22000 PF 25V |
| C1502 | CH4FF03H4Z | CC 22000 PF 25V |
| CD2001 | 068122012A | CORD EIS CONNECTOR 8122012A |
| CD2004 | 06812E004A | CORD EIS CONNECTOR 812E004A |
| CD5001 | 068122011A | CORD EIS CONNECTOR 8122011A |
| D1101 | 0010100300 | INFRARED LED LN59L |
| H5001 | 1533J91002 | HEAD,AUDIO CONTROL MH-150RP |
| L1501 | 028L000005 | ELECTRO MAGNET JTM1002-01-01 |
| M101 | 1596948001 | MOTOR,LOADING MXN-13FB09C |
| M2001 | 1510998007 | CAPSTAN,DD UNIT DFX-67B4VWA |
| PCB102 | A45101A550 | PCB ASS'Y VE0314 |
| Q1101 | 0000G00040 | PHOTO TRANSISTOR PT493FT |
| Q1102 | 0000G00040 | PHOTO TRANSISTOR PT493FT |
| Q1510 | 0002300140 | PHOTO COUPLER SPI-315-04 |
| R1501 | R001T6221J | RC 220 OHM 1/6W |
| R1502 | R001T6331J | RC 330 OHM 1/6W |
| R1504 | R002T2101J | RC 100 OHM 1/2W |
| SW102 | 0520244002 | SWITCH,ROTARY SRZZ00081A |
| SW103 | 0501211001 | PUSH SWITCH SPPB51096A |
| UN4001 | A45105A500 | UNIT,CYLINDER A45105A500 |
| UN4002 | A45105A620 | UPPER DRUM ASS'Y A45105A620 |

THIS ELECTRICAL PARTS LIST IS STANDARD PART LIST. BUT
INTERCHANGEABLE PARTS MAY BE USED IN THE UNIT.
SEE THE INTERCHANGEABLE PARTS LIST AFTER THE STANDARD PARTS LIST.

# ELECTRICAL REPLACEMENT PARTS LIST

| REF.NO | PART NO | DESCRIPTION | |
|---|---|---|---|
| **RESISTORS** | | | |
| ⚠ R502 | R615U4180J | R,FUSE | 18 OHM 1/4W |
| R1012 | R00104332J | RC | 3.3K OHM 1/4W |
| ⚠ R2075 | R63502010J | R,FUSE | 1 OHM 1/2W |
| R2112 | R00106684J | RC | 680K OHM 1/6W |
| **CAPACITORS** | | | |
| ⚠ C502 | E011T3470M | CE | 47 UF 25V |
| ⚠ C505 | E03103682M | CE | 6800 UF 25V |
| C1012 | CH40F03H4Z | CC | 22000 PF 25V |
| C2069 | CH40F03H4Z | CC | 22000 PF 25V |
| C4023 | P133002733 | CP | 0.027 UF 50V |
| C4048 | E011T2220M | CE | 22 UF 16V |
| C4053 | P613T0334J | CMPL | 0.33 UF 50V TF |
| **SEMICONDUCTORS** | | | |
| ⚠ D504 | D23TDSF10T | DIODE,RECTIFIER | DSF10TB-BT-A |
| D505 | D93017R51B | DIODE,ZENER | GZB7.5B |
| D508 | D13TGMA010 | DIODE,SILICON | GMA-01-BT |
| D509 | D13TGMA010 | DIODE,SILICON | GMA-01-BT |
| ⚠ D510 | D2LF0P300D | DIODE,RECTIFIER | P300DL |
| ⚠ D511 | D2LF0P300D | DIODE,RECTIFIER | P300DL |
| ⚠ D512 | D2LF0P300D | DIODE,RECTIFIER | P300DL |
| ⚠ D513 | D2LF0P300D | DIODE,RECTIFIER | P300DL |
| D514 | D93T06R20Y | DIODE,ZENER | GZA6.2 Y BT |
| D517 | D14T0S1980 | DIODE,SILICON | 1SS198TE |
| D518 | D94TA9R1J2 | DIODE,ZENER | HZS9R1JB2-TE |
| D1001 | D94TA5R6J2 | DIODE,ZENER | HZS5R6JB2-TE |
| D1002 | D13TGMA010 | DIODE,SILICON | GMA-01-BT |
| D1003 | D13TGMA010 | DIODE,SILICON | GMA-01-BT |
| D1004 | D28T011ES1 | DIODE,SILICON | 11ES1TA1 |
| D1501 | 002112Q050 | LED | LN81RCPH-(TA2) |
| D1504 | 002112Q050 | LED | LN81RCPH-(TA2) |
| D1505 | 002112Q050 | LED | LN81RCPH-(TA2) |
| D1507 | 002112Q050 | LED | LN81RCPH-(TA2) |
| D3001 | D13TGMA010 | DIODE,SILICON | GMA-01-BT |
| D3004 | D13TGMA010 | DIODE,SILICON | GMA-01-BT |
| D4001 | D94TA6R8J2 | DIODE,ZENER | HZS6R8JB2-TE |
| D4003 | D13TDS442X | DIODE,SILICON | DS442X-BT |
| D4010 | D94TA6R8J2 | DIODE,ZENER | HZS6R8JB2-TE |
| D4011 | D93006R20Y | DIODE,ZENER | GZA6.2 Y |
| IC501 | I03A97805V | IC | L7805V |
| IC1001 | I54D50018A | IC | OEC0018A |
| IC1002 | I06S51954A | IC | M51954AL |
| IC1003 | I07S06239A | IC | BA6239A |
| IC1004 | I03D063930 | IC | LA6393D |
| IC2001 | I97D49011A | IC | OEC9011 |
| IC3001 | I03D373300 | IC | LA7330 |
| IC3701 | I07TC7025L | IC | BA7025L |
| IC4001 | I03D37323A | IC | LA7323A |
| IC4002 | I08D369653 | IC | MSM6965-3RS |
| IC4003 | I019980090 | IC | AN8009 |
| IC4101 | I03DG73200 | IC | LA7320 |
| IC5001 | I07T67751L | IC | BA7751LS |
| Q501 | TD3H018250 | TRANSISTOR,SILICON | 2SD1825Z-LU |
| Q502 | TN7TC03001 | COMPOUND TRANSISTOR | DTC124ESTP |
| Q504 | TD30018250 | TRANSISTOR,SILICON | 2SD1825 |
| Q505 | TP7TB03001 | COMPOUND TRANSISTOR | DTA114E S-T |
| Q1001 | TD3T011110 | TRANSISTOR,SILICON | 2SD1111-AA |
| Q1002 | TA3T00984F | TRANSISTOR,SILICON | 2SA984F-AA |
| Q1003 | TC3T0536S0 | TRANSISTOR,SILICON | 2SC536-SPA-AC |
| Q1004 | TN7TC03001 | COMPOUND TRANSISTOR | DTC124ESTP |
| Q1005 | TN7TC03001 | COMPOUND TRANSISTOR | DTC124ESTP |
| Q1011 | TC3T0536S0 | TRANSISTOR,SILICON | 2SC536-SPA-AC |
| Q2001 | TP7TD03001 | COMPOUND TRANSISTOR | DTA144ESTP |
| Q2002 | TN7TD03001 | COMPOUND TRANSISTOR | DTC144ESTP |
| Q2003 | TP7TD03001 | COMPOUND TRANSISTOR | DTA144ESTP |
| Q2004 | TN7TC03001 | COMPOUND TRANSISTOR | DTC124ESTP |
| Q2005 | TN7TC03001 | COMPOUND TRANSISTOR | DTC124ESTP |
| Q2006 | TC3T0536S0 | TRANSISTOR,SILICON | 2SC536-SPA-AC |
| Q3004 | TC3T0536S0 | TRANSISTOR,SILICON | 2SC536-SPA-AC |
| Q3006 | TC3T0536S0 | TRANSISTOR,SILICON | 2SC536-SPA-AC |
| Q3007 | TC3T0536S0 | TRANSISTOR,SILICON | 2SC536-SPA-AC |
| Q3008 | TC3T0536S0 | TRANSISTOR,SILICON | 2SC536-SPA-AC |
| Q3701 | TN7TC03001 | COMPOUND TRANSISTOR | DTC124ESTP |
| Q3702 | TC3T0536S0 | TRANSISTOR,SILICON | 2SC536-SPA-AC |
| Q4001 | TA3T0608S0 | TRANSISTOR,SILICON | 2SA608-SPA-AC |
| Q4002 | TC3T0536S0 | TRANSISTOR,SILICON | 2SC536-SPA-AC |
| Q4003 | TC3T0536S0 | TRANSISTOR,SILICON | 2SC536-SPA-AC |
| Q4005 | TC3T0536S0 | TRANSISTOR,SILICON | 2SC536-SPA-AC |
| Q4006 | TC3T0536S0 | TRANSISTOR,SILICON | 2SC536-SPA-AC |
| Q4008 | TA3T0608S0 | TRANSISTOR,SILICON | 2SA608-SPA-AC |
| Q4009 | TC3T0536S0 | TRANSISTOR,SILICON | 2SC536-SPA-AC |

| REF.NO | PART NO | DESCRIPTION | |
|---|---|---|---|
| **SEMICONDUCTORS (CONT)** | | | |
| Q4015 | TC3T0536S0 | TRANSISTOR,SILICON | 2SC536-SPA-AC |
| Q4020 | TP7TC03001 | COMPOUND TRANSISTOR | DTA124ESTP |
| **COILS & TRANSFORMERS** | | | |
| L3002 | 021JA6180K | COIL | 18 UH |
| L3003 | 021JA63R3K | COIL | 3.3 UH |
| L3005 | 021B73101K | COIL | 100 UH |
| L3006 | 021JA6150K | COIL | 15 UH |
| L3701 | 021JA6101K | COIL | 100 UH |
| L3702 | 032622001I | COIL,TRAP | 2622001 |
| L4001 | 021JA6221K | COIL | 220 UH |
| L4003 | 021JA6470K | COIL | 47 UH |
| L4004 | 021JA61R0M | COIL | 1.0 UH |
| L4005 | 021B73101K | COIL | 100 UH |
| L4006 | 021JA6101K | COIL | 100 UH |
| L4007 | 021JA6330K | COIL | 33 UH |
| L4009 | 021JA6151K | COIL | 150 UH |
| L4010 | 021JA6220K | COIL | 22 UH |
| L4011 | 021JA6100K | COIL | 10 UH |
| L4013 | 021JA6100K | COIL | 10 UH |
| L4014 | 021JA6121K | COIL | 120 UH |
| L4015 | 021JA6270K | COIL | 27 UH |
| L4016 | 021JA6101K | COIL | 100 UH |
| L4102 | 021B73101K | COIL | 100 UH |
| ⚠ T501 | 0405570250 | TRANSFORMER,POWER AC | 0557025 |
| **JACKS** | | | |
| J4001 | 0602400001 | JACK,RCA PIN | JPJ2054-01-430 |
| **SWITCHES** | | | |
| SW1501 | 0504101T20 | SWITCH,TACT | EVQ-11405K |
| SW1502 | 0504101T20 | SWITCH,TACT | EVQ-11405K |
| SW1503 | 0504101T20 | SWITCH,TACT | EVQ-11405K |
| SW1504 | 0504101T20 | SWITCH,TACT | EVQ-11405K |
| SW1505 | 0504101T20 | SWITCH,TACT | EVQ-11405K |
| SW1506 | 0504101T20 | SWITCH,TACT | EVQ-11405K |
| **VARIABLE RESISTORS** | | | |
| VR1501 | V014025B05 | VR,ROTARY | EVU-F3A F20 B25 |
| VR2001 | V1263Q5BT5 | VR,SEMIFIXED | RH0636CS5R07B |
| VR3701 | V126313BT5 | VR,SEMIFIXED | RH0636C13R07B |
| VR4003 | V1263L3BT5 | VR,SEMIFIXED | RH0636CN3R07B |
| VR4005 | V126314BT5 | VR,SEMIFIXED | RH0636C14R07B |
| VR5001 | V126314BT5 | VR,SEMIFIXED | RH0636C14R07B |
| **P.C. BOARDS ASS'Y** | | | |
| PCB101 | A45105A01A | PCB ASS'Y | VV0168 |
| PCB151 | A45105A03A | PCB ASS'Y | VE0308 |
| PCB411 | A45105A33A | PCB ASS'Y | VE0244 |
| PCB501 | A45105A02A | PCB ASS'Y | VP0085 |
| PCB502 | A45105A02A | PCB ASS'Y | VE0325 |
| **MISCELLANEOUS** | | | |
| BT601 | 1412004002 | BATTERY,MANGAN | R03(UM-4(SP)) |
| ⚠ CD501 | 120M450031 | CORD AC | E2N 7FEET |
| CD502 | 1226031204 | CORD JUMPER | 26031204 |
| CD503 | 068127020A | CORD EIS CONNECTOR | 8127020A |
| CP501 | 0694430100 | CORD UX CONNECTOR | 2-173270-3 |
| CD1003 | 1226092801 | CORD JUMPER | 26092801 |
| CD1004 | 1226062802 | CORD JUMPER | 26062802 |
| CD2002 | 068126021A | CORD EIS CONNECTOR | 8126021A |
| CD2003 | 068129018A | CORD EIS CONNECTOR | 8129018A |
| CD4102 | 068124023A | CORD,CONNECTOR | 8124023A |
| CD6002 | 068QL05004 | CABLE,PAL | PDS05-DP05-3C1.5 |
| CF3701 | 10114R1703 | FILTER,CERAMIC | EFCS4R17MS4A |
| CP1001 | 0694270129 | CONNECTOR PCB SIDE | 173981-7 |
| CP2001 | 0694220129 | CONNECTOR PCB SIDE | 173981-2 |
| CP2002 | 0694260129 | CONNECTOR PCB SIDE | 173981-6 |
| CP2003 | 0694290129 | CONNECTOR PCB SIDE | 173981-9 |
| CP2004 | 06942E0129 | CONNECTOR PCB SIDE | 1-173981-4 |
| CP4102 | 0694240139 | CONNECTOR PCB SIDE | 173979-4 |
| CP5001 | 0694220124 | CONNECTOR PCB SIDE | 4-173981-2 |
| DL3001 | 104A24R436 | DELAY LINE GLASS | ADL-SE2244R |
| ⚠ F501 | 080ET1R601 | FUSE | BET 1.6 A(T)250V |
| ⚠ F502 | 080ET3R101 | FUSE | BET3.15A(T)250V |
| FH501 | 067M0T0004 | HOLDER,FUSE | H0451 |
| FH502 | 067M0T0005 | HOLDER,FUSE | H0452 |
| OS1501 | 0779010002 | REMOTE RECEIVER | GP-1U541 |
| PF3001 | 1147L15605 | FILTER,LOW PASS | 47L15605 |
| PF3002 | 1147B44608 | FILTER,BAND PASS | 47B44608 |
| PF3003 | 1147B50604 | FILTER,BAND PASS | 47B50604 |

## ELECTRICAL REPLACEMENT PARTS LIST

| REF.NO | PART NO | DESCRIPTION | |
|---|---|---|---|
| | | MISCELLANEOUS (CONT) | |
| PF4001 | 1147L30606 | FILTER,LOW PASS | 47L30606 |
| PF4002 | 103802R102 | DELAY | 3802R102 |
| PF4003 | 1141L33604 | FILTER,LOW PASS | 41L33604 |
| PF5001 | 0326230038 | COIL,TRAP | 2623003 |
| TM601 | 0762057060 | TRANSMITTER | HRS-0142-01-2150 |
| ⚠ TU4001 | 0151601014 | RF CONVERTER | MDLK6D323A |
| X1001 | 1003T4R001 | CERAMIC,OSCILLATOR | KBR-4.0MSTF |
| X3001 | 1006A4R302 | CRYSTAL HC-49/U | 4.43361875MHZ |

RESISTOR
RC.....CARBON RESISTOR

CAPACITORS
CC.....CERAMIC CAPACITOR
CE.....ALUMI ELECTROLYTIC CAPACITOR
CP.....POLYESTER CAPACITOR
CPP.....POLYPROPYLENE CAPACITOR
CPL.....PLASTIC CAPACITOR
CMP.....METAL POLYESTER CAPACITOR
CMPL.....METAL PLASTIC CAPACITOR
CMPP.....METAL POLYPROPYLENE CAPACITOR
CST.....STYROL CAPACITOR

## INTERCHANGEABLE PARTS LIST

NOTE:THE FOLLOWING PART(S) MAY BE SUBSTITUTED FOR PARTS INDICATED IN THE BASIC PART(S) LIST (WITH THE SAME REF.NO.). THESE PARTS SHARE THE SAME ELECTRICAL CHARACTERISTICS AND OTHER ELEMENTS FOR COMMON USAGE.
EITHER PART NUMBER MAY BE USED IN THIS UNIT.

| REF.NO | DESCRIPTION (PART NO) | DESCRIPTION (PART NO) |
|---|---|---|
| ⚠ T501 | 0557025 (0405570256) | 0557025 (0405570253) |